Buying CPUs That Last: Pentium vs. 486 vs. PowerPC vs. 68040, etc.

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Vol. 6, Issue 2

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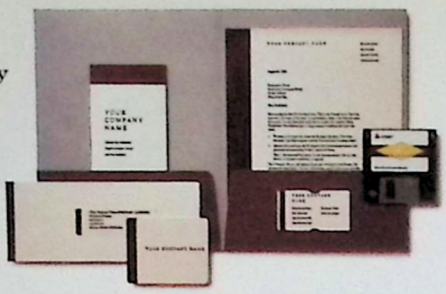

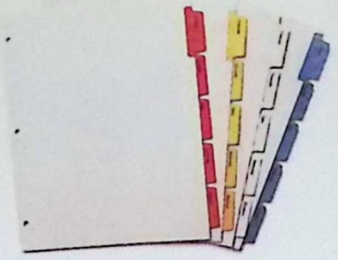

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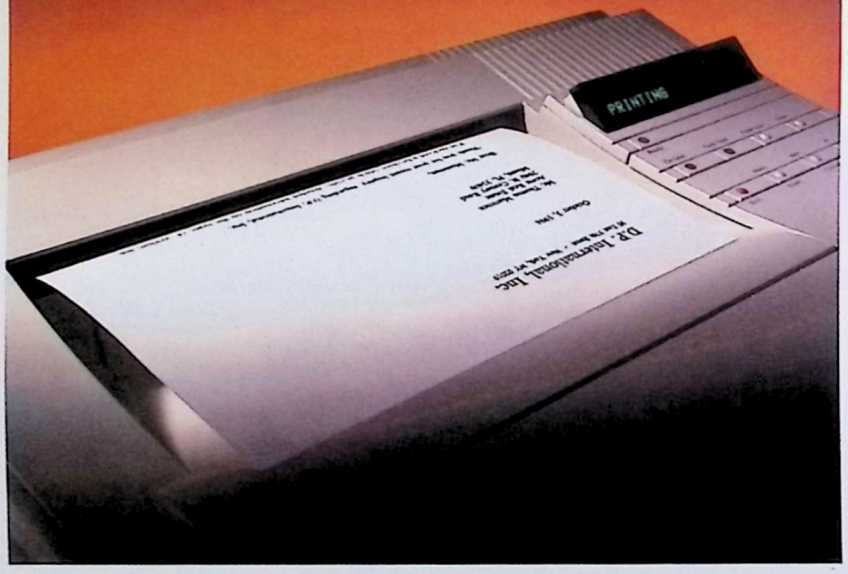

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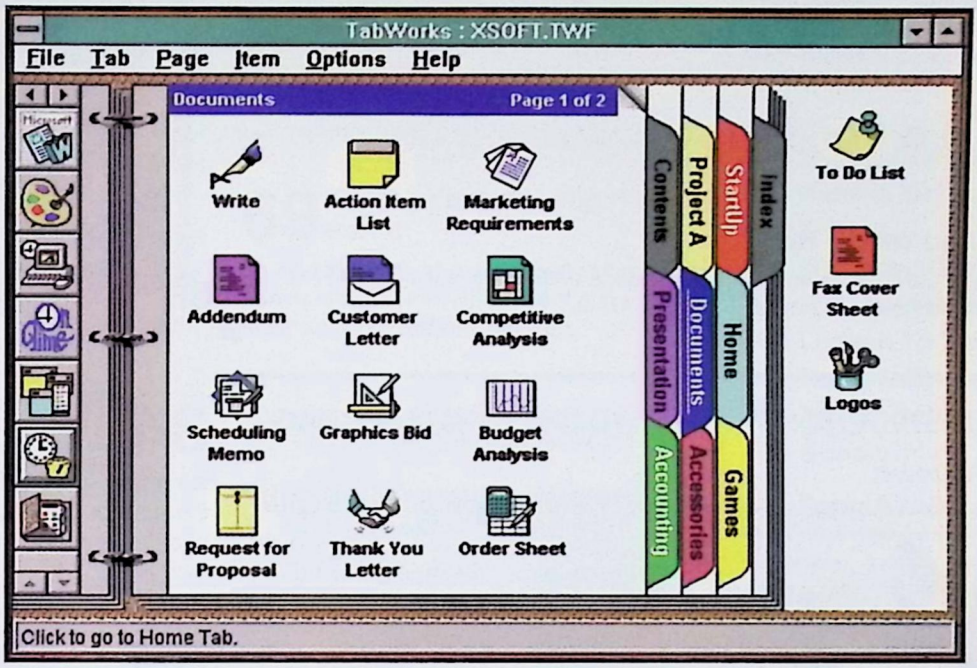
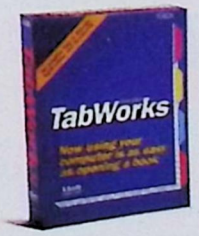
At last, software that makes using a PC as easy as opening a book.

TabWorks turns your computer screen into a notebook with tabs, a table of contents and an index. There's no easier way to work with Windows.



Now there's a simple, inexpensive piece of software from Xerox that makes using a PC as easy as opening a book. It's called TabWorks, it costs ***$49***, and it's already changed the way over ***2,000,000*** PC users work.

TabWorks looks and acts like a notebook. So you organize and manage your applications and documents in familiar ways, with tabs, a table of contents and an index. Everything you need is grouped on pages, nothing is hidden, and everything is easy to find. When you open a document, you simply double click on its icon and TabWorks opens both the document and the application you created it with so you can get straight to work. And at $49 there's no smarter or less expensive way to work on a PC. TabWorks is available for only ***$49.*** Call: ***1-800-909-4446***, ext ***1239***, today.



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THE DOCUMENT COMPANY

XEROX

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PC NOVICE®

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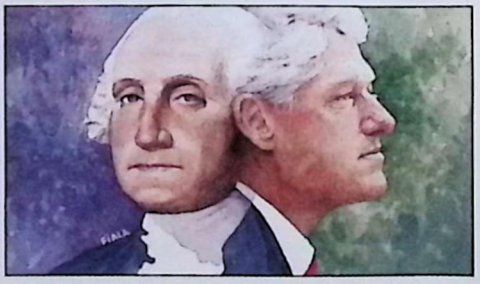

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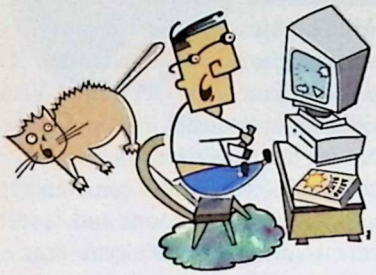

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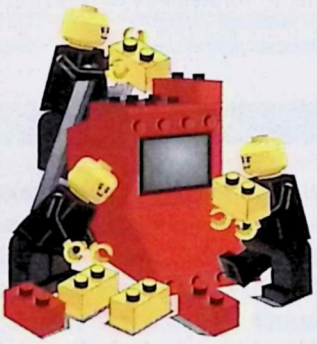

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TECHNOLOGY NEWS

Compiled by Cindy Krushenisky

Humans Beware!

No, machines have not yet taken over the earth. They've just beat us at our own game.

For the first time, a computer has outscored humans in the prestigious Harvard Cup Human Versus Computer Intel Chess Challenge last October at The Computer Museum in Boston. *WChess*, created by programmer David Kittinger of Mobile, Ala., was undefeated with four wins and two draws out of six games, and had a total performance of 83.33%.

At the Harvard Cup, an annual chess competition originating in 1989, a team of American grandmasters (the highest rank in chess) competes against powerful computer chess programs.

In the 1994 competition, six grandmasters played each of the eight computer programs once in a fast-paced game of 25 minutes per side per game.

Not only did a computer make the top score, but the total performance of all the programs also improved over the 1993 scores. The final score was Human 29 1/2, Technology 18 1/2. That means the silicon competitors gained an overall score of 38.5%, a big improvement over last year's score of 25%. ●

Better Than Money In The Bank

Personal finance programs sure seem like a good idea. They let you keep track of where your money is going, print checks, and pay bills online (if you subscribe to an extra service). However, all the money managing and transfers performed on your personal computer don't really have a direct effect on the money in your bank.

Now several companies have taken those personal finance programs a step further to make the time you spend on your computer a little more worthwhile.

Citibank (a subsidiary of CitiCorp), Bell Atlantic (of Philadelphia), and Philips Home Services (a subsidiary of Philips Electronics N.V. of the Netherlands) have jointly developed Direct Access Banking, an interactive banking service starting in the greater Washington, D.C. area.

Customers of Citibank's offices there can dial into the service 24 hours a day, seven days a week, using a modem-equipped computer and special software, or they can use a specially designed screen telephone from Philips.

Users can connect directly to their bank accounts and conduct almost all banking transactions through easy-to-understand screens. They can dial in and pay bills, check their account balance, transfer funds between accounts, find out when checks have cleared, stop payment on checks, order travelers checks, communicate with customer service, or even buy and sell stocks. They can do just about everything but retrieve cash or make deposits—that still requires an ATM machine. Then they can download all the information into their personal finance software, like Intuit's *Quicken* or MECC's *Managing Your Money*.

Herndon, Va.,-based Visa International has also started its own electronic banking and bill payment service called Visa Interactive. The service provides other financial institutions the ability to furnish electronic banking to their customers.

Through Visa's system, the banks' customers can transfer funds to other accounts, check their bank account and credit card balances, get bank statements, and pay bills electronically. Like Direct Access Banking, the Visa service will allow customers to use a variety of devices, such as touch-tone phones, screen phones, and personal computers. NationsBank, based in Charlotte, N.C., is establishing the program on its own bank-branded Managing Your Money personal finance program.

So far, Visa Interactive has already signed 28 U.S. banking institutions for its service, six of which are among the nation's top 20 banks. A few banks began implementing the service in late 1994. NationsBank plans to implement its Visa service in mid-1995. ●

"Cattle Call" Goes Digital

Normally, when casting professionals want to find the right actor or actress they have to perform something similar to a cattle call, ending up with all sorts of applicants who may or may not fit the part. Now high-speed telephone networks and powerful computers are helping to narrow the search.

A newly formed San Francisco-based company called Screen Test Online is developing the first interactive talent database for the entertainment industry. For a fee, actors, singers, dancers, and models can include their vital statistics and talents in the database. Then casting agents and producers across the country can tap into the database (also for a fee) and search for potential matches.

First, they must specify the type of talent they are looking for. For example, they may be looking for a male, 6'2'', blonde, 190 pounds, who can sing and roller-skate. The computer will search its database, producing head shots, names, and pertinent talent data. At that point, casting professionals can choose to see a video audition of an actor or hear a singer's audition song.

While the database system doesn't replace the face-to-face audition, it does eliminate the regional boundaries between major talent centers. Screen Test Online officials say the system allows the perfect face, voice, or talent to be discovered no matter where they live or work. ●

Cybermania '94

If you've seen some of the latest computer video games you know how much work must go into the creation of these games. With all the storylines, animation, and acting, you would think they were Hollywood movie productions.

In the tradition of the Academy Awards, the video game industry has its own annual awards ceremony. Cybermania '94: The Ultimate Gamer Awards was held Nov. 5, 1994, on the TBS Superstation from Universal Studios Hollywood. Like other awards programs, this two-hour televised special had its own hosts—Leslie Nielsen (best known for his "Naked Gun" movies) and Jonathan Taylor Thomas (of the ABC-TV series "Home Improvement").

Twelve awards were given out, and the winners were determined by the voting members of the Academy of Interactive Arts & Sciences, along with the viewing public via mail, phone-in votes, and the Prodigy online service. Some of the winners included *Doom* by ID Software for Best Action/Adventure and Grace Zabriskie and Robert Culp, of Philips Interactive Media's *Voyeur*, for Best Actress and Best Actor.

The Automotive Electronics Revolution

You may have heard of devices that "learn" your driving styles, unlock your car doors while adjusting the seats and mirrors, or employ security devices that sense the resistance of your key in the ignition so only you can engage the ignition.

Along with these advances, numerous devices are being developed to help us get where we are going and get there safely.

Trimble Navigation Ltd. of Sunnyvale, Calif., and Philips Car Systems of Wetzler, Germany, have created a car navigation system based on **global positioning technology**, or GPS (a group of satellites maintained by the government that broadcasts worldwide position information). Using a GPS antenna in the car's rear deck, the CARiN system would allow drivers to see their exact location on a screen, and navigate and map their route as they travel. The CARiN system was unveiled in BMW 1995 Series models in Germany.

But you don't have to buy a BMW to get the latest technology. Hertz Corp. of Park Ridge, N.J., recently introduced similar navigation systems in its rental cars. Hertz installed route-guidance systems that use global positioning technology in rental cars in California, Florida, Atlanta, Boston, Chicago, Detroit, New York, and Washington, D.C. Called NeverLost, the system provides turn-by-turn directions to thousands of destinations by means of an in-car video screen and computer-generated voice instructions.

Delco Electronics of Dearborn, Mich., is developing a collision warning system that may be available by the end of the decade. The system will hopefully help drivers avoid crashes by detecting and warning drivers of potential collisions or unsafe driving conditions. Radar sensors mounted in the front and rear of vehicles will scan an area and detect objects moving in and out of a vehicle's path. This information, along with speed, steering position, and brake and transmission status, is sent to a collision-avoidance processor to determine whether a vehicle is in danger and how quickly a collision could occur. The system then alerts the driver of a dangerous situation through visual, audio, and tactile alarms.

Los Angeles-based Amerigon Inc. is working on a similar radar device to assist drivers while they are backing up or parking. When the turn signal is turned on, radars detect objects lingering in the driver's blind spots and signal if another vehicle is too close for comfort. Amerigon hopes to have its sensors in vehicles by 1997, and several American, European, and Japanese auto makers have already ordered prototypes of the system.

SUN.ONE

In the future when you want to wake up to the morning newspaper and a fresh cup of coffee, your paper may just be a mouse click away.

The Gainesville Sun newspaper and the Interactive News Lab at the University of Florida College of Journalism and Communications will soon publish an electronic newspaper. Called *SUN.ONE*, the electronic newspaper will be set up on a local bulletin board system on which subscribers can connect via personal computer and a modem.

SUN.ONE will contain local, state, national, and international news from the printed edition of *The Gainesville Sun*, as well as wir service reports from The Associated Press and The New York Time News Service. But because the stories are electronic and don't nee to be printed or delivered, news stories will appear the night before they appear in the printed edition. The electronic edition will also sell electronic classified and display advertising.

SUN.ONE hit the electronic newsstands in January 1995.

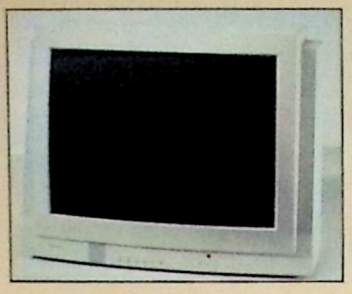
Tech Shorts

Seattle's Space Needle was created in 1962 as a Symbol of "Century 21, the Age of Space." Now the Space Needle is threading another theme for the year 2000 and beyond. It has charged Trionix Corp. of Seattle to develop the Needle into an interactive entertainment facility for the next century, entitling the project "Space Needle 2000." Trionix is planning to combine advanced technology, dramatic entertainment, and a lot of merchandising to transform the Space Needle into a world-class attraction. Plans for just what is in store are yet to be announced. . . .

Are we turning into a bunch of lazy couch potatoes? Perhaps. A Magnavox survey of American households, conducted by Opinion Research Corp. of Princeton, N.J., and sponsored by Philips Consumer Electronics of Knoxville, Tenn., found that consumers feel the television remote control is practically indispensable. One out of three Americans say watching television isn't as pleasurable without the remote control as it is with the device. Control of the remote is also a real issue in one out of every three American households.

PRODUCT PREVIEWS

Multimedia Television



We keep hearing that someday our televisions will be interactive. We will get more than 500 channels, along with movies, interactive shopping and learning, and possibly computer access through our TVs. Someday we may not need a PC and a TV.

Toshiba America must have been thinking along those lines when it recently announced the world's first "multimedia" television. It's a 20-inch television/monitor that combines a 181-channel television tuner and a high-performance picture tube with VGA monitor capabilities. (Video graphics array is a monitor standard that generally displays 16 colors.)

You can use the Toshiba Integrated Multimedia Monitor (TIMM) for such computer applications as interactive multimedia programs on CD-ROM, CD-I (an interactive CD-based multimedia technology by Philips Electronics) programs, and all video games. The reason is that TIMM is VGA-compatible so it can be immediately hooked up and used by DOS-based computers.

Or, you can use TIMM as a television. A built-in stereo television tuner offers full television reception, even with Closed Captioning. It has outlets for connection to VCRs and other home theater components. A remote control even lets users control the television and adjust the size of the picture for computer-related functions.

Toshiba says it projects that potential uses for TIMM exist in environments with limited space like college dormitories or office conference rooms, and for multimedia presentations, video editing, desktop video conferencing, and interactive educational programs.

The Toshiba TIMM monitor will be available in April 1995 for a suggested retail price of around $1,000. For more information, contact Toshiba at (800) 631-3811.

It's Touch And Go

Controlling your computer is really a mechanical, dehumanized process. You either key in commands through your keyboard or guide them in through a **mouse** or **trackball**. (Mice and trackballs are pointing devices that control your on-screen cursor.)

A few advances have been made so that we can communicate with our computers in a more natural way. But until handwriting and voice recognition is up to snuff, many companies are improving the way we interact with our computers through the sense of touch.

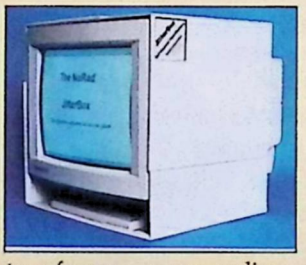
For example, you might have already heard about the GlidePoint by Cirque Corp. (800/454-3375) in Salt Lake City, Utah. It's a pointing device that lets you control your on-screen arrow by moving your finger across the GlidePoint surface and tapping your finger to click and double-click.

Now a company called Synaptics in San Jose, Calif., has taken that even further with the TouchPad. It's a pointing device that not only senses your finger's position on its surface, but also the pressure of your touch.

You move your finger across the TouchPad's mylar surface to move the cursor. You also can drag objects on-screen, or tap and tap twice with your finger to replace clicking and double-clicking with a mouse. But when you place the TouchPad in graphics tablet mode, a "Z-factor" senses the pressure of your finger on the TouchPad as you design images.

Unfortunately, you can't go out and purchase a TouchPad in stores just yet. Currently, it is only available to computer manufacturers, so you may be seeing it attached to systems by companies like Epson and Twinhead Corp. soon. You can reach Synaptics at (408) 434-0110.

Exterminating The Jitter Bug



Does your monitor have the shakes? If it sits amid a number of other monitors, it may have cause to jiggle.

Monitors, **scanners** (devices that convert a paper image to a digital image in a computer file), printers, or even electrical service panels, transformers, or power lines can give off disruptive magnetic signals. As these invisible fields bounce around the room, they may come in contact with your monitor and interfere with internal magnetic fields that control the electron beam that writes the image to your screen.

If the external field is strong enough and differs from the frequency of your monitor's **refresh rate** (the vertical scanning rate that draws the images on-screen), the images you see on your monitor may appear to jitter or wave.

If you would prefer to be the only object at your desk to dance and swim, NoRad Corp. of Carson, Calif., has developed a new gizmo called the JitterBox that can help your screen stand still.

The Jitterbox is an adjustable, expandable box that fits like an external "hood" around the top, sides, and bottom of your monitor and monitor stand. It's made up of an alloy processed for high-magnetic permeability that attracts and absorbs magnetic fields before they reach your monitor.

The JitterBox come in three sizes, ranging in price from $395 to $595. For more information, contact NoRad at (800) 262-3260 or (310) 605-0808.

Do You Make These Six Common Mistakes On Your Taxes?

Six common mistakes can cause you big headaches on your taxes. An oversight here, an omission there. From unnecessary tax payments to full blown IRS audits—you can end up paying too much … or worse. But now, using TurboTax® or MacInTax®, you can avoid these simple but costly mistakes:

1 The Arithmetic Error
Today, even the simplest forms contain complex calculations. And with all the late-night scrambling, an innocent mistake could cost you plenty.

2 The Transcription Error
With all those numbers being juggled from schedule to schedule, it's no wonder the figures are so often transcribed incorrectly or entered on the wrong line.

3 The Omitted Form
Even "ordinary" returns require anywhere from six to a dozen forms to complete. It's easy to miss one or end up rushing all over town to find the one you need.

4 The Misinterpreted Instruction
At best, IRS instructions can be tough to understand. At worst they can be mind-boggling. What you need are clear directions in plain English.

5 The Overlooked Deduction
You'd have to be a professional tax preparer to know all the deductions you're entitled to. If you miss just one, it could cost you hundreds of dollars.

6 The Exceeded Guideline
The fastest way to trigger an IRS audit is to exceed the "normal" range on one of your deductions. You need to know what the IRS looks for on a line-by-line basis.

When you do your taxes with TurboTax, mistakes like these are virtually impossible. And filing your taxes couldn't be easier.

Now With TAX ADVICE

America's #1 Tax Software

The fastest, easiest way to do your taxes right. With a new Windows interface and enhanced capabilities for 1994, America's #1-selling tax software now makes preparing your income taxes easier than ever. Just gather your records and receipts, sit down at your computer and let TurboTax's award-winning EasyStep® tax preparation system guide you through every step of the way. Then print out your forms, sign them and drop them in the mail. It's that easy!

New "smart features" save time and ensure accuracy. Our TaxAdvisor™ points out overlooked deductions and mistakes on the fly—while you're entering your data into our Windows and Macintosh software—to improve the accuracy of your return. And the SmartAudit™ feature hunts down errors, omissions and likely audit items …and takes you directly to each item and tells you what to change and how. All in a fraction of the time you'd spend checking and revising your return manually.

Get more out of Quicken® with TurboTax. Our TaxLink innovation lets you work with TurboTax and Quicken—America's #1 personal finance software—as if they were a single program. Zoom in on tax-related Quicken transactions from within TurboTax—item by item—and reassign tax categories to maximize your tax savings. Then jump back to TurboTax and see the recalculated results. (Windows version only.)

TurboTax Quicken

Take our powerful CD-ROM for a spin. TurboTax on CD-ROM offers concise, full-motion video and audio assistance, plus over 60 IRS publications and expert tax advice from Marshall Loeb, former managing editor of Fortune magazine and tax attorney, Mary Sprouse, former IRS Audit Group manager, and author of the The Money Income Tax Handbook.

PC WORLD

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Multimedia Guide To

Heavenly Hosts

Both angel devotees and those who are just supernaturally curious should find captivating information in *Angels: The Mysterious Messengers*, $59.98, from Live Interactive. This well-organized and tastefully designed CD-ROM gives an overview of angel scholarship from the fall of Lucifer to Clarence of "It's A Wonderful Life" fame.

The disc draws much of its information from the popular NBC special of the same name aired in May 1994. Other resources include examples of classical art, interview footage with angel experts, and a soundtrack that sets an angel-studying mood. Musical choices include a New Age-style track, classical music, and Christmas themes.

Angels offers four main sections or Angel Worlds: "Angels and You," "Angel Encounters," "Angel World," and the "Angel Gallery." The interface is decorated throughout with ornate borders and small angels holding navigational buttons. The Previous and Navigation buttons make it easy to quickly find a main menu and go to the information of choice.

"Angels and You" provides listings of angel groups, meetings, and shops throughout the United States. The program takes a New Age twist in a guided meditation where users are encouraged to stare at scenic photos and envision themselves walking through peaceful meadows with their personal angel. Angel Letter explains the best way to write to heavenly beings. No air mail required.

"Angel Encounters" addresses how the beings affect humans in sections like "Dark Angels," "Healing Angels," and "Near Death Experiences." "Dark Angels," for example, provides narrated films about demonic possession and Satan's expulsion from heaven. "Angel World" provides academic resources such as a circular diagram explaining the hierarchy of the angel culture and an encyclopedic almanac of major terms. The "Fact or Fiction" roundtable presents questions about whether angels have wings or halos and why they appear to humans. Users click on photos of angel experts to hear them weigh in on these issues.

The "Angel Gallery" turns to artistic and pop culture expressions regarding angels. Sources range from Raphael's art to clips of Jimmy Stewart's Christmas classic of an angel film.

Angels proves impressive with its ease-of-use, distinguished presentation, and variety of viewpoints. Both meditation-prone and Biblically based users will find information to interest them.

Former Christmas pageant actors, however, may be disappointed to learn that angels don't wear tinfoil halos.

Live Entertainment
15400 Sherman Way
Van Nuys, CA 91406
(800) 326-1977 ●

Software Opens Letterhead Airways

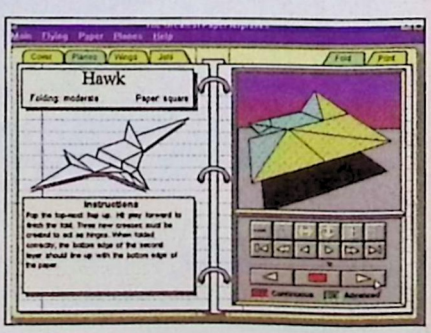
So you think folding paper airplanes is just slacking off? Kittyhawk Software disagrees. The company deemed document aviation a pursuit noble enough to merit a how-to software package. As a result, we have *The Greatest Paper Airplanes*, a program allowing former junior-high troublemakers to take an old hobby to a new level. This Windows program provides animated instruction for building a variety of paper craft from Gliders to Darts to Starships.

Airplanes' interface is intuitive and colorful. Users see a three-ring binder notebook with arrows for turning pages and tab markers for jumping to different sections. A history section provides highlights of man's pursuit of flight and some basic principles like lift, drag, and angle of attack. Color drawings decorate nearly every page. When clicked, the drawings go into action and sound effects play. The fate of an ambitious German is played out in one animation as the wind blows his small craft into a mountainside.

The software includes animated instructions for 25 planes. The notebook's left page holds an instructional box displaying text instructions for each fold. The right page holds a graphical window where a moving piece of paper gradually becomes a plane. VCR-like buttons let users move to the next fold or replay any step they missed. The image can be rotated or zoomed for better viewing angles. The roll feature was especially handy when we wondered if the folds on our plane's bottom fit the model's. We rolled the model over and checked our work against the fold lines in the picture.

A print function produces a sheet with dotted lines to guide your folding. Artistic users could import the designs into an art program, slap on color and graphics, and print the sheet. Airplanes comes with a 50-page pad of lined sheets with simple decoration. There's also a "folding airplanes" screen saver that shows plain sheets of paper transforming into clever designs.

Airplanes proved popular around our office. Everyone wanted to get in on the test flights and offer design tips. Our question was whether software for making paper airplanes was really worth $39.95. The answer lies in how seriously you take pulp aviation.



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Tucson, AZ 85728
(800) 388-9622 ●

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There's finally an online service that offers special access for retired persons.

America Online is the first online service to provide AARP (The American Association of Retired Persons) Online. The AARP is the nation's leading organization for people 50 and older.

Members of the association and America Online (AOL) subscribers can have access to membership and benefit information, bulletin board discussions, and real-time conversation by using the service.

This service also allows AARP members to take advantage of America Online's many services, including SeniorNet, the international community of computer-using seniors, more than 40 special-interest publications, and more than 50 special-interest clubs. Other services with topics in personal finance, travel, and continuing education also will be of interest to seniors as well.

In general, the service will enable AARP members and AOL subscribers to find information on topics that affect senior Americans and let them communicate and share experiences with other seniors.

Users who already have an America Online account can access AARP Online through a keyword search. IBM and IBM-compatible PC users can start a keyword search by pressing CTRL-K; Macintosh users would use COMMAND-K. Once in the search screen, type **aarp**.

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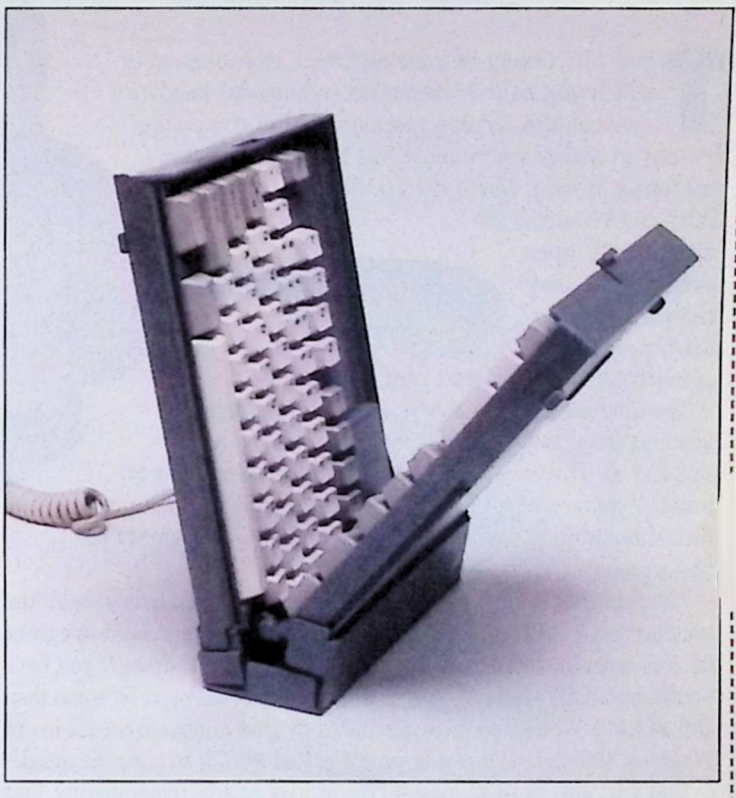
Vienna, VA 22182-2285
(703) 448-8700
(800) 827-6364 (to order AOL software) ●

Half The Keyboard It Used To Be



Owners of crowded desktops take note. Keyboards don't have to consume a chunk of prime desktop real estate measuring 18 inches by 8 inches. Golden Pacific electronics offers a space-conscious keyboard that folds in half to a trim 10 inches by 6-3/4 inches. Those whose desk serves as a multi-purpose workspace will probably be especially interested in the Foldable Keyboard, $69, since it can be stashed out of the way when the PC isn't in use.

The jack-knifing peripheral should also shine as an auxiliary keyboard for portable computers. It could be carried in a suitcase for motel use or simply attached to the portable PC at home. When shut, the keyboard is resistant to dust and potentially disastrous liquid spills around the office.

The Foldable Keyboard's clam-like personality doesn't force limitations on its functionality. When open, it's the same size as a standard keyboard with 101 keys, including a separate numeric keypad. Golden Pacific didn't scrimp on details. The board has fold-out legs for angled typing; status lights for Cap Lock, Num Lock, and Scroll Lock; and brackets to keep the board upright when folded.

Golden Pacific Electronics
560 S. Melrose Street
Placentia, CA 92670
(714) 993-6970 ●

DOS and Windows

How Do They Get Along?

Tired of working in a monochrome environment in which you have to memorize commands? Ready for new colorful windows to the world of computing? It's easy to change your outlook just by installing a new operating system: Microsoft Windows. Although DOS and Windows are different PC operating systems, they can work together seamlessly, as well as independently, to increase your productivity.

There are a few basic points you should know to help you understand how these programs work, and how to install and use Windows. Whether you have tried repeatedly to install Windows or are breaking the installation disks out of their shrinkwrap, it is relatively simple to isolate and remedy potential problems.

The relationship between DOS and Windows is fairly symbiotic. Windows needs DOS 3.1 or higher to work properly; it also needs plenty of random-access memory (RAM) and space on your hard drive. If you have trouble installing Windows, your problem could be that you have less than 2MB of RAM. While experts suggest that 2MB is the minimum needed to run Windows, 4MB assures that your programs will work at an adequate speed.

You will also need at least 40MB in disk space, remembering that Windows needs about 10MB and each Windows application you load onto your hard drive will consume 15-20MB. If you want to multitask in DOS and Windows (have programs open in both simultaneously), you need to have a 386 CPU or higher, otherwise you can only work with one operating system at a time.

Check your PC to see that it meets Windows' basic requirements. *NOTE: Do not try to install Windows if you have a PC with two floppy drives and no hard drive!*

Preparing for Installation

Before installing Windows, you need to do some basic hard drive housekeeping by backing up the programs and files on your hard drive to floppy disks or other media. (Consult your DOS Manual for instructions on the BACKUP command.) Once your files are backed up, delete any obsolete files. Get rid of any applications or data files that are no longer needed or used to free up disk space. Without adequate disk space, Windows cannot modify the Autoexec.bat file as it must to run properly. Also get in the habit of creating backup copies for all of your applications and data as this will save you time and grief later.

One of the keys to avoiding future problems when you install a new program is to create a backup copy of your Config.sys and Autoexec.bat files on disk. (For instructions on creating a system disk, see "Installing A Hard Drive" and its accompanying sidebars in the December 1994 *PC Novice*.) These files determine how your computer works. If the application you install has special instructions, it may change one or both files. If at any point you want to revert to a previous version of Config.sys or Autoexec.bat, having these older files on disk can allow you to write over the newer files, effectively starting where you know your computer was last functioning properly.

Two other tasks to complete prior to installing Windows are defragmenting and checking your hard drive. These can be accomplished by sequentially running DEFRAG and CHKDSK within DOS Shell. *NOTE: Do not use DEFRAG or CHKDSK from Windows once it is installed. Always activate the utility from DOS.*

DEFRAG, which appeared in DOS 6.0, is a command that tells DOS to reorganize your hard drive. By using this command, you tell DOS to regroup the information stored on your hard drive into consecutive or contiguous order so it can easily access it. If you do not have DOS 6.0, you should optimize your hard drive using utilities such as *Norton Utilities* or *PC Tools*. Optimizing your hard drive, whether you use DEFRAG or another utility, will allow your computer to function more efficiently.

After running DEFRAG, run CHKDSK. This command issues a report describing the drive in terms of bytes and lets you know if there are any critical problems on your hard drive. It also gives information about directories and files, the disk space being used, and information about the system's memory.

You may want to refer to your DOS manual to learn more about DEFRAG and CHKDSK.

Print a hard copy of your Config.sys and Autoexec.bat files. Legibly date these and place them in a file along with the backup disk you made. These are troubleshooting tools. You can use your printed copy of these files to compare with the on-screen display. Other than changing those two files in DOS, Windows will not alter any other program.

Terminate TSRs

Windows will notice if there are terminate-and-stay-resident programs (TSRs) on the hard drive that change its operation. A terminate-and-stay-resident program is a program that stays loaded in memory for easy access by the operating system. In DOS, PRINT and FASTOPEN are examples of TSR commands.

There are also a number of commercial applications that install themselves to operate as TSRs. These programs function in the background

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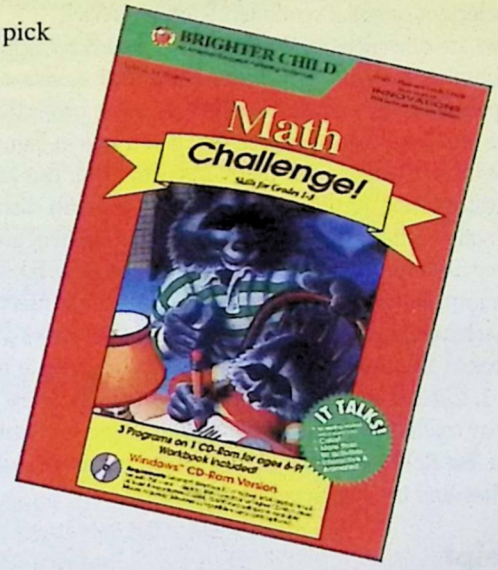

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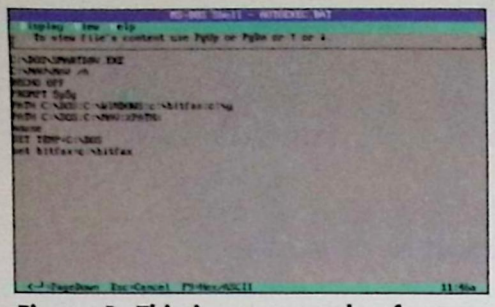

Figure 1: This is an example of a typical Autoexec.bat file.

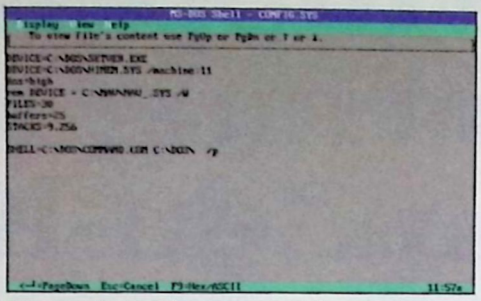

Figure 2: Another startup file, Config.sys, tells your computer how to communicate with peripheral devices.

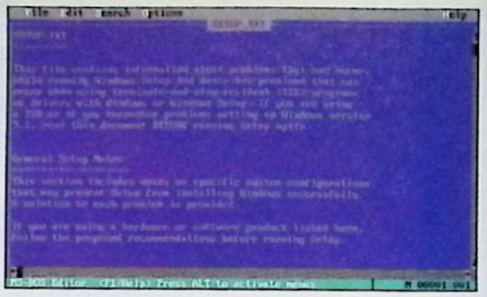

Figure 3: The Setup.txt file is one of the many resources you can turn to for help.

while other applications are open, or can be accessed with a hotkey. These include screen saver programs such as *Pyro!* and programs with alarm clock or calendar reminders such as *Sidekick*.

There are other TSR applications, such as *Norton AntiVirus*, which become obsolete if you run Windows and DOS 6.0. This version of DOS is equipped with its own utilities, such as virus protection, so you don't need to purchase a separate program. If you look at Figure 2, you can see the line in the Config.sys file that starts with REM. This line instructs DOS to activate Norton AntiVirus. The REM (or remark) command is used to create notes within a DOS file. Placing REM in front of any information in a startup file tells DOS to disregard that information, but users can still see what information was needed for that application to function.

If you have tried the Express installation and Windows does not run properly, look at the Config.sys file. It should look similar to the one shown in Figure 2. Chances are, the instruction lines enabling these programs to operate may conflict with the way Windows is telling your system to operate.

Place the REM command in front of the possibly troublesome lines in these files, and try installing Windows again.

Help!

Once you begin the installation process, and even after Windows is installed, there are plenty of guides to help you with troubleshooting. In DOS, you should read the file Setup.txt prior to installing Windows.

For example, if there is a hardware problem, Setup.txt lists the display drivers that are not compatible. You are also able to get basic advice on how to override potential problems.

Installation Basics

Ready to install? Put in the first Windows installation disk in your floppy disk drive, make that drive current, then type **setup**. Windows then gives you two options. The simplest option is to use Express installation and let Windows install itself. Yes, you just sit by the computer and babysit it while it does the work.

Windows 3.1 does a good job of checking your system during installation, which takes 10 to 15 minutes. The Config.sys and Autoexec.bat files will be modified automatically during Express installation. You are the computer's arms and hands, so stay by your computer to extract and insert the multiple installation disks. You may also be prompted to type in information, such as your name and a company name. This information should match what's on the program's registration.

Once Windows has loaded, you should see its graphical user interface. If you do not, it is likely that there was a problem during installation. Don't panic. Take a deep breath, reboot your computer, and refer to Setup.txt if you skipped that suggestion earlier. Windows often encounters problems with non-standard hardware, including monitors, printers, or video cards, which it does not recognize. Some of these problems and suggested remedies are outlined in Setup.txt and the owner's manual for your computer.

Windows also gives you the option of custom installation. This option allows you to examine and approve any changes Windows may make in the Config.sys and Autoexec.bat files. Read through the software instruction manual thoroughly to see if you really want to use this option.

Altered States

Problems can occur if an application on your computer creates a **disk cache**, a place in the computer's memory where information is stored before the user sees it. A disk cache changes the manner in which the computer reads information. It speeds up the performance of the computer by putting the information where it can quickly read it rather than writing it directly to the hard drive. Again, utility programs such as Norton Utilities and PC Tools include this memory management feature.

You should not be using more than one utility program at a time. With Windows, disk caching is an integral part of the operating system and is loaded automatically when Windows is installed. If you experience problems operating Windows, a check of your directory may reveal that this type of program is causing the trouble.

Once Windows is installed, read a file in the Program Manager's Main group titled "Read Me." This detailed file provides more information about sources of potential Windows problems. After that, run through the tutorial to familiarize yourself with Windows.

Not The Last Resort

Unfortunately, you still may need a skilled computer technician if your problems are particularly thorny. You might even want to try a technical support line (See "Technical Support: A Life Raft For Beginners" in the November 1994 *PC Novice*). There are also a number of excellent reference books available in bookstores on these topics. Participating in a local user group or an online forum can be a vital, valuable source of information, as well as a means of getting questions answered by the been-there-done-that users, and perhaps even the software company's support staff.

Remember: even though you've given your computer new Windows to its world, good ol' DOS is still around. ●

by Linda Dailey Paulson

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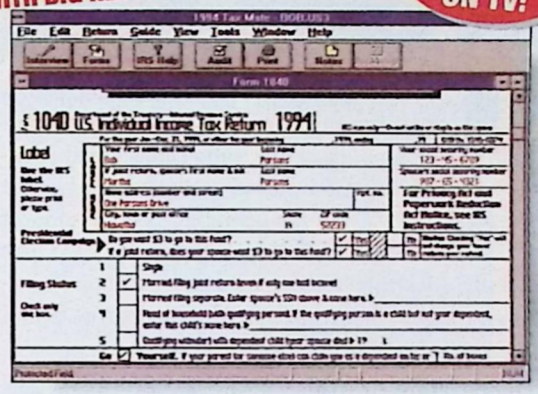

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DOS Command Dictionary

How To Use Different DOS Commands

FDISK

FDISK, found in DOS 3.2 and later, allows users to prepare a hard disk drive for use with DOS and to control creation of hard disk subsections called **partitions**. Most computers come with DOS installed on the hard drive and the drive already prepared to run with the operating system, so most users won't need FDISK. If you do decide to reconfigure the hard disk partitions, move carefully. All information on hard disk partitions modified with FDISK will be lost. Always back up the hard drive before using this command.

FDISK accepts one parameter, **/status**. This parameter displays the tatus of the hard disk without running the FDISK utility. It *will not* arm data if you type **fdisk/status**.

Typing FDISK begins a series of menus in which the utility provides steps to guide you through working with active partitions, logical drives, and other aspects of hard disk organization. Every hard drive running MS-DOS must have a **primary DOS partition** (this is where your system files will be stored); this may or may not occupy the entire hard disk. An **extended DOS partition** can be created to contain **logical drives**, which DOS treats as separate disk drives. Logical drives receive their own letter designation, such as D:, and can be used to store files for a single program. Then those files are accessed by specifying a drive letter rather than a directory.

Unless the primary DOS partition takes up the entire disk drive, an **active partition** must be designated. This is the partition from which the PC's main operating system works. Some users load operating systems other than MS-DOS in different partitions. If the PC is going to run MS-DOS at startup, the active partition must contain MS-DOS.

Logical drives and partitions can be deleted without affecting data in other drives and partitions. The main FDISK menu includes options to manipulate all of a hard disk's partitions and logical drives.

After changing the size of partitions, or creating partitions and logical drives, you must use the FORMAT command to format each hard disk section separately. (For a full tutorial on FDISK, see page 14 in the January 1995 *PC Novice*.)

LASTDRIVE

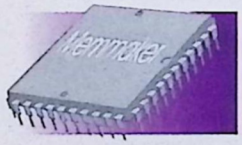
If your system contains several disk drives, RAM disks, or CD-ROM drives, the LASTDRIVE command can be useful. (A RAM disk is reserved memory that acts like a virtual disk drive.) The LASTDRIVE feature, found in DOS 3.0 and later, lets users specify the number of drive names available and the number of drives accessible on the system. Enter the LASTDRIVE command as a line in the **Config.sys** file rather than typing it at the command prompt. (The Config.sys file is a DOS system file that contains commands controlling device drivers and system resources.)

The LASTDRIVE command is typed as:

lastdrive=x

followed by ENTER. The *x* represents a letter between *A* and *Z*. The number of drives allowed is indicated by the letter entered and corresponds to that number's position in the alphabet (one drive=A, two drives=B, 16 drives=P, and so on). DOS, by default, sets the last drive as the one after the last drive used on your computer. If you have two diskette drives and a hard drive, the default last drive setting will be D:, or one more than you're currently using. If the letter parameter you enter indicates fewer drives than the computer is using, DOS ignores the command.

Note that DOS reserves memory space for every drive indicated with the LASTDRIVE command. This means you shouldn't specify more drives than you'll actually need.



MEMMAKER

DOS 6.0 and 6.2 include the MEMMAKER command, which automatically optimizes a PC's memory use. The utility accomplishes this by moving as many **device drivers** (software that helps DOS work with hardware) and programs as possible into **upper memory** (memory reserved for DOS system use and device drivers). The process frees up **conventional memory**, the memory under 640KB used to run programs, for use by applications. While it can cost users much time and irritation to manually optimize memory use, MemMaker makes the process nearly automatic.

Start the utility by typing **memmaker** at the command prompt. From there the process is explained in text screens that guide users and keep them informed of what steps the program is taking. User choices include options such as Custom or Express setup and when to exit MemMaker. Because reconfiguration includes altering crucial DOS system files such as Config.sys and Autoexec.bat, which only run at startup, MemMaker restarts the PC twice during its optimization. The utility does this automatically, and the rebooted PC will return to the point at which it left off in the MemMaker process. Before the PC reboots, on-screen messages tell the user what is coming up.

When the optimization is complete, MemMaker displays a report on what it has accomplished. Computers that were previously equipped with memory management but needed some fine-tuning

will probably see small memory gains. PCs with no previous memory management may see large gains in the amount of available conventional memory.

If the PC performs poorly after running MemMaker, you can eliminate the changes the utility just made. Type:

memmaker/undo

at the command prompt. This returns the computer to its previous configuration.

Adding the batch parameter by typing:

memmaker/batch

causes MemMaker to run by itself, choosing the default options for all prompts, and returning the computer to its original configuration if errors occur. Open the file Memmaker.sts for a report on changes made by the utility.

REPLACE

DOS 3.2 and later offer the REPLACE command for replacing files in a directory with new files of the same name. Parameters allow the command to add files without replacing old ones or to update existing files only if they're older than the incoming files.

A common REPLACE command looks like this:

replace a:\sources.crd c:\ /s

This command indicates that the file Sources.crd on the diskette in drive A: will replace any files named Sources.crd in any subdirectory on drive C:. The **/s** parameter causes REPLACE to search for and replace files in all subdirectories of the destination drive.

The **/a** parameter adds new files to the destination directory rather than replacing existing files. It cannot be used with the **/s** or **/u** parameters. The **/u** parameter updates only the files that are older than that in the source directory. For example, if the file C:\WINDOWS\Sources.crd in our example was created today, but A:\Sources.crd was created last week, the C: file will remain unchanged. The **/p** parameter prompts the user for confirmation before replacing or adding files, and **/w** causes REPLACE to wait while you insert a disk before beginning the operation.

As files are updated, added, or replaced, a message appears and displays their filenames. A (Y/N) prompt appears after the filename if the **/p** parameter is used. At the end of the process, DOS lists a message like "2 file(s) replaced" or "no file replaced."

Remember that REPLACE also can be used to update files between two floppy diskettes.

UNFORMAT

This command is an undo option for disks **formatted** (erased) by the FORMAT command, including floppy diskettes and hard disks. It serves as a guard against accidental deletion of information. An additional advantage of the UNFORMAT command is its ability to rebuild corrupted **disk partition tables** (a part of the hard disk that functions as a separate storage unit). The command is available in DOS 5.0 and later.

Note that if the disk was formatted with the unconditional switch attached to the FORMAT command, the UNFORMAT command will not be able to restore data. The unconditional switch (**/u**) erases all data during formatting.

In order to first find out if UNFORMAT can retrieve the data from a formatted disk, type:

unformat [disk drive]/test

at the command prompt. The letter of the disk drive will be the drive which holds the disk to be unformatted (usually A: or B:) or the computer's hard disk (usually C:). This search phase of UNFORMAT does not alter anything on the disk, and DOS offers multiple on-screen warnings before it proceeds with any changes to the disk.

Once DOS has determined that it can restore a formatted disk, you can use the UNFORMAT command by typing:

unformat [disk drive]/l

The **/l** switch is an important part of the command because, without it, UNFORMAT will list only subdirectories and files that are fragmented. Adding the **/l** switch, however, lists every file and subdirectory found by UNFORMAT. This takes longer, but the switch makes it possible to restore a deleted directory in some cases when the diskette hasn't even been formatted. Such directory re-creation is somewhat unreliable, though.

Adding the **/p** switch will output messages to LPT1 (the default printer port) for printing.

VER

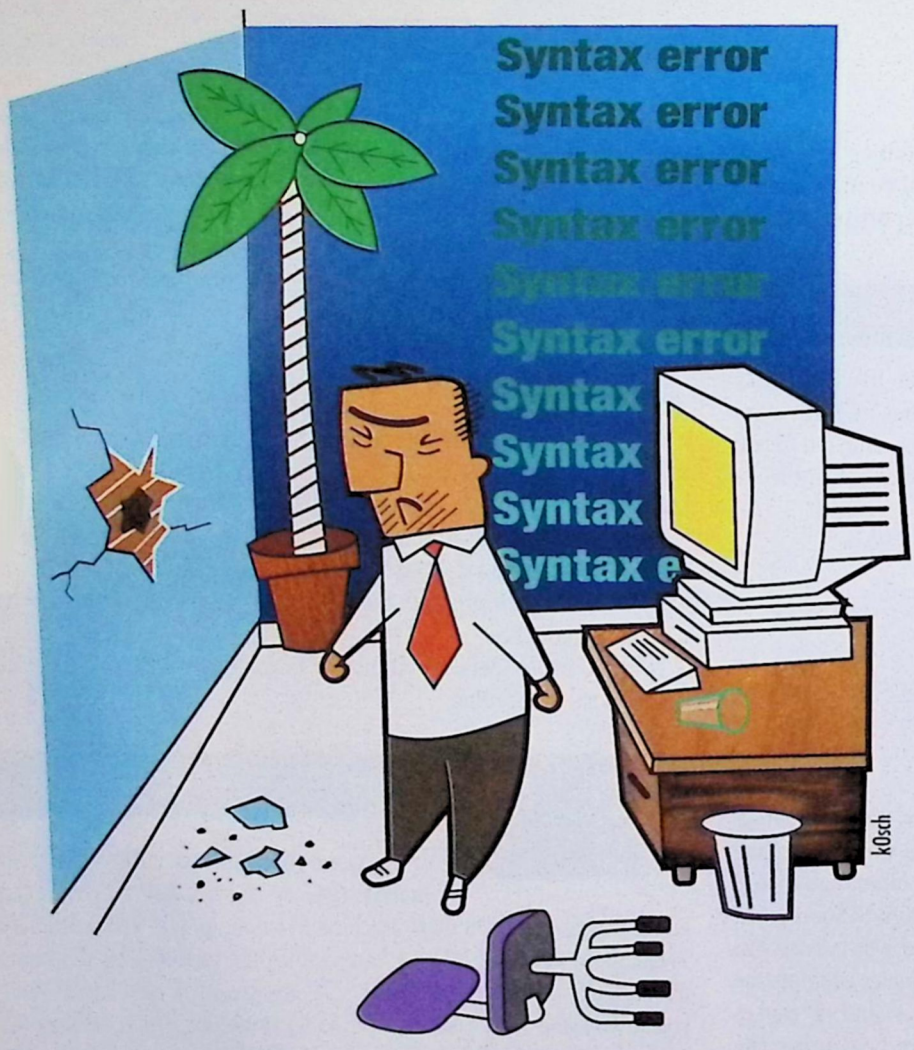
Many novice users wonder what commands they can use because they're unsure which version of DOS their machine is running. The VER command, available in versions 2.0 and later, solves the problem by displaying which DOS version the PC uses. The command is also handy when you're working with a strange PC and wondering which version (and commands) are available. To find your DOS version, type **ver** at the command prompt. The command has no parameters.

The VER message displays the major version number, a period, and the minor version number. VER messages look like the following:

MS-DOS Version 5.00

by Trevor Meers

Dealing With DOS Error Messages



It happens to all of us. No one gets off scot-free. DOS delivers arcane, mysterious messages that can be real brainteasers at times—even to DOS gurus. Messages like "Abort, Retry, Fail?" leave us perplexed and perhaps clueless as to what we should do next. . . and what might be the outcome of an unfortunate misunderstanding.

What's In A Message?

A DOS error message is displayed after you run a DOS command or DOS utility program. Many DOS error messages tell you something is wrong and that some sort of "fix" is needed. Other error messages are merely informational and don't mean anything is wrong at all.

Generally speaking, a DOS error message informs you of a condition that cannot be properly handled by DOS without some sort of action taken by you. Here's a classic example: If you try to use two different capacity diskettes while running DOS' DISKCOPY utility, you'll be presented with the error message, "Drive types or diskette types not compatible." This message tells you that the diskettes you're trying to use are not identical in capacity, and that you need to make sure the diskettes used are the same. Once this is resolved and you run DISKCOPY again, you'll see another message telling you that some data was found on the target diskette, and that DISKCOPY will erase any data located on the target diskette.

We'll Make It Better

In this article, we'll explain the meaning of the most prevalent DOS error messages and tell you what to do when you see them. You'll find that some versions of DOS differ slightly in the content of their messages, even though the meaning is the same. We're going to cover DOS versions 5.0 through 6.22 to ensure that this information is relatively timely. Think of each description as a potential "band-aid" you can apply whenever DOS decides to play a little too rough.

- **Abort, Retry, Fail?**

This message appears when you've asked a DOS command or DOS utility to perform a task on a diskette that is not in the right drive, or is not the right diskette type for the task. This message may also appear if there is no diskette in the drive you specified. If you've simply overlooked the write protect tab on a diskette, fix the problem, press *R*, and DOS will retry the operation. If you want a fast "out," press *F* until the DOS prompt appears again. You may be required to tell DOS which drive is "OK" before it will let you off the hook.

- **Bad command or filename**

This message appears when you've typed a command or filename and DOS can't find the file. First try retyping the command, including the full path name.

If the message still appears and you're trying to run a DOS command, you've either made a typing mistake or your current version of DOS doesn't recognize your command.

- **Cannot find system files**

This message is displayed when you try to make a (bootable) system diskette and DOS can't find the system files. Switch drives/directories so that the current DOS prompt tells you that you're in the boot directory, then try making your system diskette again.

- **Cannot load Command.com, system halted**

You must have started your computer with a system diskette in a floppy drive. You've also been running a program from a floppy diskette, and that program needs to find Command.com. Put that system diskette back into the floppy drive and try again.

- **Directory already exists**

This message appears when you try to create a new directory and it already exists (or the name, at least, has already been used).

- **Existing format differs from that specified**

You'll see this error message when you are reformatting a disk or diskette to a different capacity. This is a "good" message. You'll have to tell DOS it's OK to continue.

- **File cannot be copied onto itself**

You've omitted a destination location for the file you're trying to copy. Type **help copy**, then press ENTER for more information on how to use the COPY command properly.

- **File creation error**

Either the filename you specified is already in use, or the disk is write protected. If you're sure the diskette is not copy protected (by checking the tab on the diskette itself), try using a different filename. If these solutions don't work, try creating your new filename on another diskette or disk. You may simply have too many files located in the root directory of your hard drive.

- **File exists**

You're trying to name a file with a name that's already in use. Use the DIR command to check out the existing files in the current directory, then select another filename.

- **File(s) not found**

Check the filename and path for typing accuracy. You either typed inaccurately or the file doesn't exist in the location you specified.

- **Formatting while copying**

This is a "good" error message. It means the diskette you're using needs to be formatted for use in order to hold information. It takes a lot longer to format a diskette during a COPY or DISKCOPY process.

- **Help not available for this command**

You must have asked for help on a command or utility program that is not supported by your current DOS version, or you've typed inaccurately.

- **Incorrect DOS version**

The version of Command.com doesn't match the version expected to be found by a program you're trying to run. You may have more than one version of some DOS files on your computer, and the program you're trying to run is finding an older (or newer) version by mistake. You may have to reinstall DOS to fix this problem.

- **Insert system disk**

DOS needs you to insert a bootable system diskette into a floppy drive.

- **Insufficient disk space**

The disk is full. You have to delete some files to make more free disk space.

- **Insufficient memory**

Your computer is out of memory. Close programs running in the background to solve the problem.

- **Invalid date**

You have failed to use the proper format for a date. Use the DATE command to review the acceptable format and try again. Use this to fix an Invalid time error message as well.

- **Invalid directory**

DOS can't find the directory you specified. Verify that the directory does exist and that your typing is accurate.

- **Invalid drive in search path**

You must have made a hardware change. This message is telling you that you need to update your PATH statement to reflect drives that exist in your computer.

- **Invalid filename**

DOS can't find the file you specified. Use the DOS Shell program to verify the name and location of the file, then try your task again. Your problem could simply be a typing error.

- **Invalid media type**

You've got a bogus diskette on your hands. Reformat this disk or use another one.

- **Invalid parameter**

You've used a fancy command that is not useful to DOS. Type the name of the utility program you wish to use, followed by the /? parameter, then press ENTER to review a list of acceptable command parameters.

- **Non-system disk or disk error**

You're trying to start your computer, but it can't find a system diskette. Place a bootable diskette in your A: drive and press ENTER.

- **Out of memory**

A program can't complete its task because there is not enough free memory. Close some other running programs to free up memory. If no other programs are running, you may have to add memory capacity to your computer. Consider buying a memory-management program before you spend money on memory chips.

- **Path not found**

Either you haven't typed correctly or you've specified a drive (or directory) that doesn't exist.

- **Press any key to continue . . .**

Another "good" error message, this one gives you time to read displayed text before a task process is continued.

- **Printer error**

Your printer is either turned off, out of paper, or offline.

- **Proceed with Format (Y/N)?**

This message appears when DOS believes that the diskette you are trying to format will not be "unformattable" in the future. Press *Y* to continue or *N* to stop the formattin process.

- **Stack overflow - system halted**

Reboot your computer, then edit your Config.sys file so that the value of STACKS= is increased by 10.

- **Syntax error**

You've either incorrectly typed a long command or you've used jargon unknown to DOS.

- **System transferred**

This is a "good" error message. It means that your newly created system diskette is capable of starting your computer for you.

- **Terminate batch job (Y/N)?**

You've either interrupted a batch file in progress or the batch file is defective for some reason. Type *Y* to return to the DOS prompt.

- **This disk cannot be unformatted**

DOS normally can "unformat" a diskette but doesn't believe it can unformat the diskette being used. Not a problem usually, so try again or use another diskette.

- **Too many open files**

It's time to increase the value of the FILES= statement in your Autoexec.bat file. The value should range between 10 and 70.

- **Write protect error**

The diskette in use is write protected. Make the disk "writable" or use another diskette. ●

by Robert Mullen

The Ideal Computer Puzzler: Crosswords For Windows

It's your favorite time of the week—Sunday afternoon. Time to sit back and relax with the Sunday newspaper crossword puzzle.

1 Across: Egyptian Spirit

Three letters. Hmmm. This might be tougher than you thought. You'd better grab the crossword puzzle dictionary. After 10 frustrating minutes of searching, you finally find the answer: Akh. You can move on to another clue.

8 Across: Obsolete Spanish Coin

Eight letters. You can feel your blood pressure rising before you even open the dictionary. Maybe shoveling snow from the driveway would be less stressful.

Crossword puzzles don't have to be a torturous experience, though. You can use crossword puzzle software and your computer to complete the grids. If you get stuck, you can have the computer give you a hint—no more waiting until the following Sunday to figure out that impossible clue.

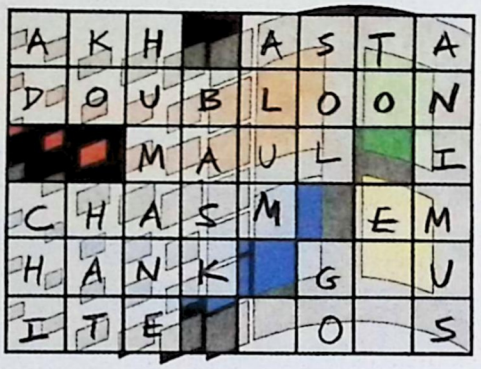
We'll look at five programs designed for use with Microsoft Windows. While they require a 386 microprocessor, these programs don't require a lot of memory or hard disk space.

Lyriq

Lyriq Crosswords: The Premium Edition from Lyriq International Corp. is a versatile program containing 270 puzzles from five sources with four difficulty levels. Lyriq Crosswords requires 1MB of hard disk space and 1MB of random-access memory (RAM).

Selecting a puzzle to fit your level of expertise is simple. The menus of available puzzles list the difficulty level (children, easy, medium, and hard), size, and estimated completion time. The puzzle sources include *Crossword Magazine*, *Penny Press*, and *The Washington Post*.

Your options for hints include having the program answer a difficult clue or tell you instantly which answers or characters are correct and incorrect. Using hints, however, lowers your puzzle score. The program calculates your score by using the puzzle's difficulty level, your time required for completion, and the number of correct answers. Lyriq Crosswords recalls the best scores in the form of a Top 10 list.



The program's options for entering answers are sensible; if you click on a square, you can enter a letter in it. Large puzzles can be viewed completely on one screen, but the clue numbers aren't visible in the puzzle grid. You can use the program's Zoom feature to enlarge the individual squares so the numbers are visible, but then the entire puzzle won't fit on the screen.

Lyriq Crosswords: The Premium Edition, $29.95
Lyriq International Corp.
1701 Highland Ave.
Cheshire, CT 06410
(800) 433-4464

Swfte

If you enjoy a crossword challenge, you'll find it in *The New York Times Crossword Puzzle* from Swfte International. The program features a number of famed expert-level *New York Times* newspaper puzzles. The program requires 1MB of RAM and 1.5MB of hard disk space.

The program includes 250 puzzles that are divided by the days of the week (Monday puzzles are the easiest and Sunday puzzles are the most difficult). You can work on one of the last four puzzles you used or you can choose from a menu that lists the percentage of completion of puzzles you've tried.

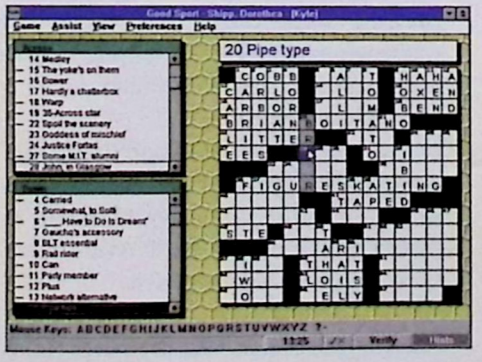
Unless you've solved a lot of crosswords, though, you'll have a tough time from the start. You will be "rescued" by the program's helpful hint options that let you ask the program to check each character as you type or check completed words. You also can have the program fill in a particularly tough word. While the puzzles themselves can be difficult, puzzlers won't have the added "pressure" of a ticking time clock or a scoring system.

The program's entry features are somewhat awkward because you must double-click on a box to enter the answer. It's easier to use the program with the keyboard alone rather than a combination of the keyboard and mouse. Another somewhat annoying element is that the largest puzzles don't fit entirely on the screen, forcing you to use scroll bars.

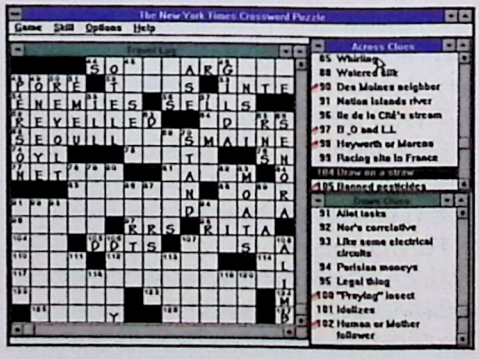
The New York Times Crossword Puzzle, $49.95
Swfte International Ltd.
722 Yorklyn Road
Hockessin, DE 19707
(800) 237-9383

Dynamix

Running out of puzzles shouldn't be a problem with *Take A Break! Crosswords* from Dynamix. (Dynamix is a division of Sierra On-Line.) The program, which requires 2MB



***Lyriq Crosswords* allows you to make all entries using the mouse.**



***The New York Times Crossword Puzzle* will challenge expert puzzlers.**

of RAM and 3MB of hard disk space, ships with 750 Dell Crossword puzzles. You can choose from three difficulty levels and four sizes. No matter what size you choose, the entire puzzle fits on the screen, which is a desirable feature. Unfortunately, smaller puzzles are squeezed into a tiny square, rather than expanded to fit the available space.

Similar to The New York Times program, the menu of puzzles lists the percentage of completion of all the puzzles you've started. Only the puzzles available under the selected difficulty level and size are shown.

Entering answers in the puzzle is simple and logical and can be aided with hint options, which include automatic word checking or revealing a single letter or an entire word. The program's scoring is similar to the Lyriq program.

The user guide also provides a history of puzzles (including a blank copy of the first crossword puzzle that appeared in an American newspaper) and explains the game's options. A pocket crossword dictionary is included, too. The program has a few cartoon-like animation effects, but they can be suppressed.

Take A Break! Crosswords, $24.95
Dynamix (a division of Sierra On-Line)
1600 Mill Race Drive
Eugene, OR 97403
(800) 757-7707

Centron

After scratching your head over a few expert crossword puzzles, your mental picture of their authors probably resembles something between a fourth-grade spelling teacher and a 17th-century executioner. Cruelty must be their specialty, you think as you stare at a mostly blank screen. What's the best way to exact your revenge? Create your own crossword puzzle, of course.

Crossword Creator from Centron Software allows you to create your own crosswords. The software requires 1MB of RAM and 1MB of hard disk space.

To make a puzzle, type the words you want to use into a word list and then tell the program to create a puzzle using those words.

Don't expect the program to make a neat square puzzle like you'd find in a newspaper; the puzzle will resemble a skeleton puzzle. In a traditional crossword, every open square must be part of an across and down clue, which makes puzzle creation difficult. Words in a skeleton puzzle only intersect at a few points in the word. You can try turning the program's skeleton puzzle into a more traditional puzzle by manually editing the skeleton puzzle.

Crossword Creator gives you access to an online thesaurus with search features. The thesaurus doesn't include things like prefixes, suffixes, proper nouns, or foreign words, though, so you may want to keep a crossword dictionary handy.

Creating a puzzle is a major challenge for any crossword fanatic, but Crossword Creator makes it easier. Still, finding words that fit together is extremely difficult. You'll discover that crossword authors often use words like "oord" out of necessity, rather than cruelty. (Oord is a Dutch monetary unit, by the way, in case it comes up in a puzzle.)

Crossword Creator, $59.99
Centron Software
1500 Hwy., 15-501 North
Southern Pines, NC 28387
(800) 848-2424

Cogix

Crossword Wizard from Cogix Corp. is different from the other programs we've considered. Rather than using puzzles from other sources, the program has the ability to create more than one million puzzles, taking into account the size and difficulty level you select. It requires a minimum 386 microprocessor (a 486 is recommended), 2MB of RAM, and 5MB of hard disk space.

You can build puzzles from scratch, using all of your own words and clues, or you can provide the program with a few words, and it will add other words and attempt to create a traditional crossword for you.

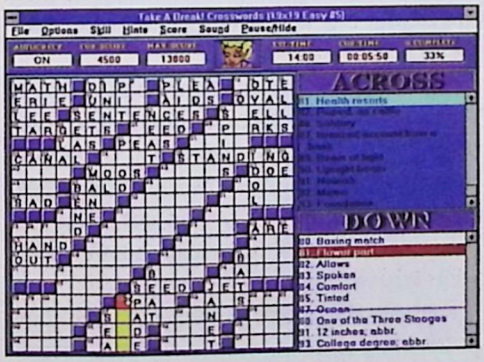
A Word Builder program is included with the program, allowing you to find words that meet certain criteria. An Idea Wizard program is included, showing you how words are related and improving your vocabulary.

The program is surprisingly quick when creating puzzles, often taking less than a minute on a 486 computer. It will be three to five times slower, though, on a 386. While the program gives you a fresh puzzle every time, the answers and clues won't be as detailed or clever as those created by puzzle writers. All puzzles created are traditional puzzles, rather than the skeleton puzzles found in Crossword Creator.

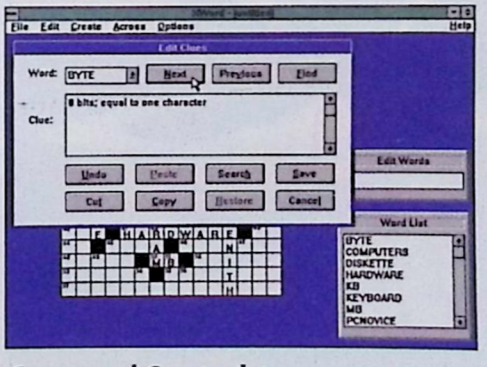
Some of the answers and clues generated by the program are difficult to comprehend. Even at the easiest level, you'll probably need to use the program's extensive hint features, such as character verification, word verification, and word search. Crossword Wizard, however, is easily the most interactive program we considered.

Crossword Wizard, $39.95
Cogix Corp.
419 Redwood Road
San Anselmo, CA 94960
(800) 455-3388 ●

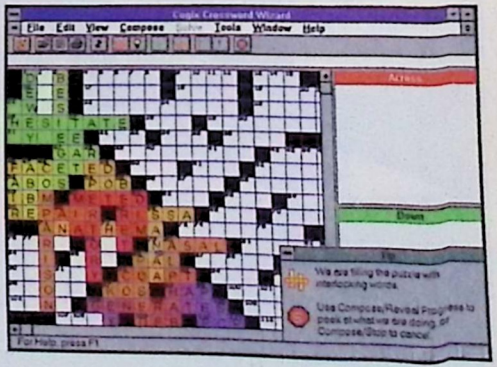
by Kyle Schurman



Take A Break! Crosswords **includes 750 puzzles and some cartoon-like effects.**



Crossword Creator **lets you create puzzles from your own word list.**



Crossword Wizard **can create up to 1 million different puzzles while you watch.**

The Makings Of The

Microprocessor

As complex as life is now, it only seems to get more complicated. Personal computers are no exception to that rule. In the past when buying a new computer, you had one, major purchasing decision—whether to get an Apple or an IBM, or IBM-compatible, PC. Then you'd purchase the latest and greatest machine and hope the beige system matched the rest of your office decor.

The color hasn't changed much, but never before have your choices been greater. Each type of computer has a plethora of processors to choose from. If you want an Apple computer, you must decide if you want a computer with a Motorola chip or one with the new PowerMac chip. Or, if you decided on an IBM or IBM-compatible computer, there are several 86 chips, Pentiums, PowerPCs, or clone compatibles that must be considered.

While technology continually tries to make our lives easier, it seems our brains must work harder to keep up with all this stuff. Before putting your brain through any undo strain deciphering clock speeds, cache, or system architectures, join us as we explain one of the most important components in your computer—the microprocessor.

What Is A Microprocessor?

The **microprocessor**, otherwise known as the **central processing unit** or **CPU**, is a silicon chip that contains all the central processing functions of a computer. More simply, Dan Auton, director of desktop marketing for Cyrix, says the microprocessor is the "brains" of your computer.

"It interprets all the **software** and decides what actions will be taken per each software instruction," he explains. (Software is a set of instructions the computer uses to perform a task.)

All this metallic brain power controlling your computer is packed into a grey or black plastic casing measuring on average about 1-1/2 x 1-1/2 inches, Auton says.

If you were to open up your computer, you'd see the microprocessor resting on a plastic board covered by a number of computer circuits. This is the **motherboard**, the main circuit board of the computer to which all other components are connected or directly attached.

Little wires, or prongs, that protrude from the microprocessor's edges plug into the motherboard so the microprocessor can communicate with all of the computer components connected to the motherboard.

How Does It Work?

The plain, black chip you see gives no clue as to all the complex communications going on inside. Within the microprocessor are numerous, tiny transistors that make up the bulk of the microprocessor.

Transistors act as on/off switches to create the **binary language** your computer uses to process data. Each on or off represents a 0 or a 1 in the computer's code, or a **bit** of information, which is the smallest unit of data measurement. When you put together eight bits, you have one **byte**, which is the amount of information needed to produce one alphanumeric character (like a C or a 3).

These bits and bytes are also important in how the microprocessor communicates with other parts of the computer. Bits of data signal travel on information highways, called **buses**, inside the microprocessor and out of the microprocessor to tell other computer components what to do.

Actually, the inner workings of your computer are a maze of buses. When a microprocessor carries out commands, it processes the information through buses inside the chip.

This Ought To Keep You Busy For A While.

Now many Packard Bell multimedia computers come with 27 software titles, including 11 CDs. For growing minds. For growing businesses. To get work done. And then have fun. Truth is, no other computer gives you this much to do, right out of the box. So get Packard Bell. And then get busy.

Packard Bell™

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David Hinz, senior technical marketing manager for Intel, says these internal buses allow different parts of the processor to talk to one another. The microprocessor then passes on this information via a **data bus** that links the microprocessor and other chips, boards, and buses.

Hinz says the internal buses are a lot like pathways and hallways inside a building. The data buses are "hallways" connecting the microprocessor to board and chip "rooms" or to other "hallways," or buses.

Data Highways

Just like the highways you travel in your automobile, data bus highways have "lanes" that limit the amount of information traveling down the bus at one time. The width of the data bus, or the number of lanes it has, is not the same for all microprocessors.

Different microprocessor "models" transfer information at different rates. A microprocessor with a wider data bus can move more information more quickly than a microprocessor with a narrow data bus. To determine the size of the data bus, look at what model number the computer carries.

For example, the 8086, one of the earliest microprocessors developed in 1978 for the personal computer by Intel, processed 16 bits of information internally and had a 16-bit data bus. That means it could transfer 16 bits of data to and from the microprocessor. The next generation of microprocessor was introduced in 1984 and was called the 80286 (simply referred to as the 286). The 286 also had a 16-bit data bus. Next was the 386 in 1985. It had a 32-bit bus, doubling the amount of information processed internally and externally.

Today, one of the most popular microprocessors, the 486, also has a 32-bit data bus processing 32 bits of information internally.

However, not all microprocessors process the same amount of information internally as can be passed along through the data bus. One example is the most recent generation of microprocessors introduced by Intel, the Pentium. The size of this microprocessor's data bus is 32 bits, which means it transfers 32 bits of information out from the microprocessor to instruct other computer components. But the Pentium can process 64 bits of information on the inside. That means this chip can process information on the inside faster than it can disseminate information to other parts of your computer. The Pentium is also unique because it does not have a number-based name, unlike other Intel microprocessors.

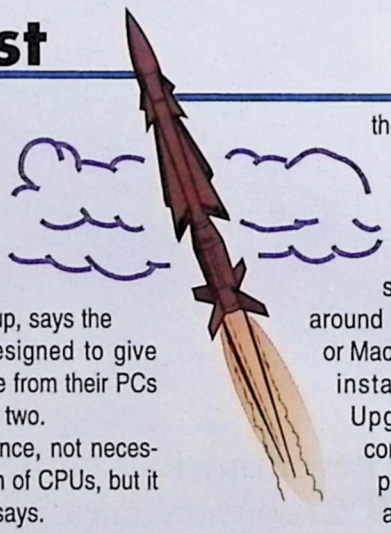
System Standards

Unfortunately, comparing one chip to another isn't as simple as looking at the model number of the microprocessor. Different companies have different standards.

It all started in the 1970s when a small company named Apple Computer began selling the first commercially successful personal computer, called the Apple II. As desktop personal computers began to catch on, larger companies became interested in producing personal computers—one of which was International Business Machines (IBM).

In 1981, IBM released its own PC to compete with the Apple computer. IBM did not create its computers to work with the Apple computers. Instead, the IBM computers were made with a different architecture and different operating system.

Giving Your CPU A Boost



Many computer companies are looking to the future, when the whiz-bang system you buy today will become old and outdated.

To give your microprocessor an added boost, most computer companies are making their systems upgradeable. By plugging an additional chip onto your computer's motherboard or replacing the motherboard with a new one, you may be able to boost your CPU's performance, or upgrade it to the next generation of microprocessor.

A complete upgrade may require replacing the microprocessor with one with a faster clock speed and a better architecture available from the same microprocessing company (like Intel, Apple, or Cyrix) or from a third-party vendor (like Kingston Technology or Evergreen Technologies). Or, it may require plugging an additional chip onto the motherboard.

For example, if you own an Intel-based system and you want a little extra processing power, Intel offers a special OverDrive processor for its 486 line and soon for its Pentium processors. The OverDrive doesn't replace the existing microprocessor, but rather pops into a vacant socket on the system's motherboard.

Debbie Hoffman, Intel's channel marketing manager for the Pentium processor group, says the OverDrive processor was designed to give users a little more performance from their PCs if it's needed in another year or two.

"It will boost your performance, not necessarily up to the next generation of CPUs, but it will give it a mid-life kick," she says.

The OverDrive processor may or may not be a solution for you. Since they cost from $200 to $650 and are verified to work only with Intel microprocessors, you may want to buy a new system when the time comes.

Rumor has it that IBM is developing a chip to fit into the OverDrive slots of Pentium motherboards, thus upgrading Pentium PCs into PowerPCs. No information is yet available regarding IBM's plans to market the microprocessors or how much the microprocessors might cost, but you may begin hearing about the chips sometime in 1995.

Macintosh buyers who purchased an Apple system without the PowerPC microprocessor are also in luck. For around $650, Macintosh Quadra or Macintosh Centris owners can install a Power Macintosh Upgrade Card inside their computers to run PowerMac programs four times faster along with the existing Mac programs. This deal includes some extra software. For around $700, an authorized Apple reseller can install a Macintosh Processor Upgrade to give the same speed capabilities to Macintosh Quadra, LC, and Performa computers. For between $999 and $1,999, an Apple reseller can upgrade your Macintosh with a Power Macintosh Logic Board Upgrade, giving your computer the identical capabilities of the Power Macintosh model to which you've upgraded. ●

Other companies interested in manufacturing their own PCs realized they couldn't compete with IBM's worldwide marketing. IBM's machines were expected to become the PC standard. So companies began designing personal computers that could work and be compatible with IBM's computers. These **clone** systems were built with the same kind of microprocessors and structure as IBM, thus they could run the same types of software programs as IBM.

Most companies used the same kind of microprocessors made by Intel to ensure their compatibility. (Companies today, however, are making a dent in Intel's market share. Digital Equipment Corp. has developed a fast processor called the Alpha chip and other companies such as Advanced Micro Devices, Texas Instruments, and Cyrix are selling chips similar to the 486 and Pentium processors. (For more information, see "Alpha" and "Alternative Options" in this issue of *PC Novice*.)

Apple decided its systems could survive on their own without clone systems made by other manufacturers. The company believed itself and the Apple brand to be an established leader in the personal computer market, even though the software written for its computers would not work with IBM and IBM clones.

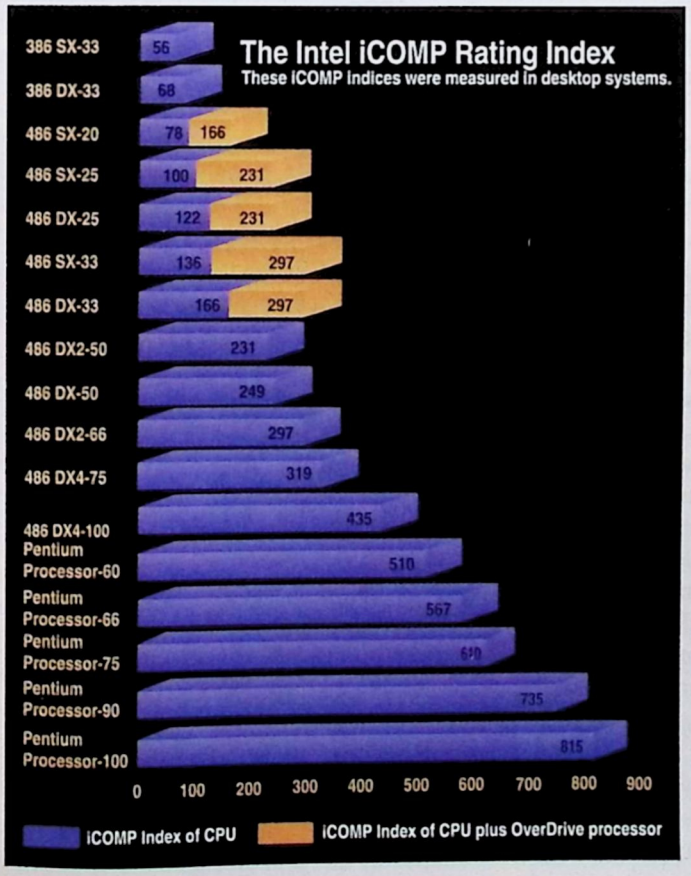
Apple microprocessors weren't made by Intel, but were produced by Motorola. Instead of names like the 386, 486, or Pentium, Apple's personal computers were powered by chips like the 68030 and the 68040. (For more information, see "Motorola" in this issue of *PC Novice*).

For a long time, shopping for a computer meant deciding between an Apple Computer system or an IBM, or IBM-compatible, computer. Until just recently, that is.

Motorola, IBM, and Apple teamed up to create a microprocessor that, with special software, will operate programs made for both types of computers. It's called the PowerPC microprocessor.

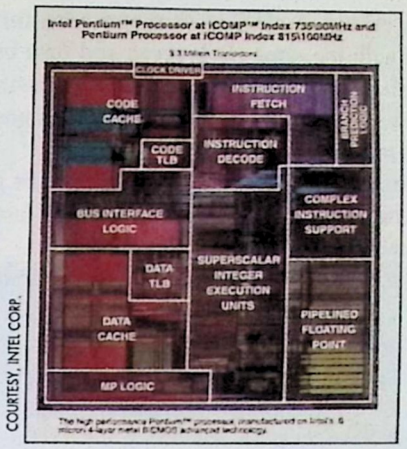
Currently, you can find numerous Apple personal computers, called PowerMacs, with this chip. As a matter of fact, the company has announced plans to move all of its Macintoshes to the chip within the next few years. IBM has also announced plans to introduce PCs based on the new chip soon. (For more information, see "PowerPC" in this issue of *PC Novice*.)

Figure 1. Intel Corp.'s iCOMP index compares a number of industry standards to determine the power of various microprocessors.



System Speeds

Although there are numerous types and standards for microprocessors, there is one type of measurement that all have in common. All microprocessors have **system clocks** that help to regulate how fast they operate. Rather than using minutes or seconds, a microprocessor's **clock speed** is measured in **megahertz** (MHz), with one megahertz equaling a million clock cycles per second. Occasionally you will see clock speeds shown immediately after the model of the microprocessor. For example, a particular model may be labeled 486DX2/66, in which the 66 stands for a 66MHz clock speed.



COURTESY, INTEL CORP.

Tremendous processing power is packed in the architecture of a microprocessor.

Clock speed helps to distinguish one Motorola chip from another, since they all have the same microprocessor model. For example, the 68040 found in Apple computers is available in different speeds; the Performa 630 635, 636, and 638 run at 33MHz or 66MHz.

Many of the Intel microprocessors also ca. run at different processing speeds. For example, the 486DX2 can run at speeds of 50MHz or 66MHz, the 486DX4 can run at speeds of 75MHz or 100MHz, and the Pentium can run at speeds of 60MHz, 66MHz, 90MHz, and 100MHz.

A rule of thumb for clock speeds: the higher the processor number, the greater the speed of the microprocessor and the more the price of the microprocessor.

Processing Power

All of these models and measurements can be confusing, especially when they overlap.

Take, for example, the 486DX4 microprocessor and the Pentium microprocessor. They have similar clock speeds, but that doesn't mean they have the same processing power.

Megahertz is not really a measure of performance, Auton of Cyrix says.

"Megahertz is like [revolutions per minute] in your car. You can have a Volkswagen with 6,000 rpm and you can have a Dodge Viper with 6,000 rpm," he says, "and there's going to be a huge difference in how fast you are going."

The design of a chip is the most important consideration in determining a microproces-

sor's power. A 486DX4 chip and a Pentium chip with the same clock speed and data bus width won't have the same processing ability—the Pentium's architecture is designed to be more powerful.

Part of the difference lies in the features on the chips that make the microprocessor faster or slower.

The use and the amount of **cache memory** on the microprocessor can make a difference in processing power. Intel's Hinz says that cache is an extra area of memory placed on the processor itself. Cache allows a processor to act on frequently used data without having to refer to outside components first, making its operation a lot faster than a chip without cache.

Many chips include an additional chip called a **math coprocessor,** also known as a **floating point processor,** which is indicated on 486 CPUs by a DX added to the model name. These extra components let the microprocessor handle complex mathematical calculations and graphical functions more quickly.

Look at the Pentium, for example. It has a special characteristic called **superscalar technology,** Hinz says. This means the Pentium has more than one "pipeline" to execute instructions, making it much quicker than microprocessors that only transfer information through one.

Some computer companies may include benchmark results in their advertisements to show you how much processing power their systems have. Auton says tests like *SPEC* or *PC Bench* measure the performance of microprocessors while they're carrying out similar tasks. Other tests like *BAPCo* and *Winstone* measure the overall performance of the computer, including the CPU, the **random-access memory** (RAM is the temporary memory in your computer), the **video graphics card** (which powers the monitor), and other computer components.

Beware, however, benchmark tests can be deceiving. Benchmarks that test a computer's overall performance check more than just the CPU. The kind of software programs used—like a graphics program or a spreadsheet—can skew the performance; a system may perform well creating graphics, but not as well compiling numbers in a spreadsheet. Some analysts even say that a few tests can be slightly tuned by the tester. Before you take a benchmark too seriously, first find out what the test is measuring and how important that feature is to what you will be doing with your computer.

If you are looking to buy a system with an Intel microprocessor, the company has developed its own comparative rating for its chips, says Debbie Hoffman, Intel's channel marketing manager for the Pentium processor group. The iCOMP rating index is not really a benchmark test, but rather measures the performance of all Intel chips under a variety of working conditions (like floating-point equations, graphics, and video) and shows how they compare for non-technical users. Since the 486SX/25MHz chip was the entry-level microprocessor at the time the index was created, it was given an index value of 100, and all other microprocessors are compared to it. (See Figure 1.)

More To Come

Now that you know what a microprocessor is and how it works, we will talk about the specifics for each type of chip and the companies that make them. In the end, we'll recommend what to buy with the most processing power to last you in the long run. ●

by Cindy Krushenisky

Microprocessor Mumbo-Jumbo

When you compare microprocessors, you're sure to run across a bunch of confusing, technical terms. We've compiled a brief list of some of the more common ones and their definitions.

CISC—Complex Instruction Set Computing. Found in Intel's 80386 early chips, and Motorola's 680x0 chips, CISC chips recognize a large number of instructions and compute complicated instructions efficiently, causing, however, a slightly slower performance rate than RISC chips.

EISA—Enhanced Industry Standard Architecture. An expansion bus standard that is 32 bits wide.

Emulation—In most cases, if one product "emulates" another product, that product works, or tries to work, just like the other product.

Expansion bus—A bus that connects an expansion board with the CPU. The expansion board plugs into the motherboard to add new components to your computer.

Floating Point Processor—Floating point notation is a way to represent large numbers with numerous zeros, or small numbers with numerous zeros after a decimal point, without using all those zeros. For example, 185,000,000 might be represented as 185E6. A floating point processor, also called a math coprocessor, allows the microprocessor to more easily work with floating point numbers and other mathematical equations.

ISA—Industry Standard Architecture. An expansion bus standard that is either eight bits or 16 bits wide.

Local bus—A pathway directly linking peripheral components, such as your monitor and the microprocessor.

MIPS—Millions of Instructions Per Second. This measurement gauges how quickly a microprocessor can process instructions per second, but the measurement may be misleading because the types of instructions can be manipulated.

PCI—Peripheral Component Interconnect. PCI is a local bus standard from Intel. It places a buffer between the CPU and the peripherals and can support more devices than the VL-Bus standard.

RISC—Reduced Instruction Set Computing. Found in PowerPC and Alpha microprocessors, RISC chips execute simple instructions faster than CISC microprocessors, which are designed to handle a wider array of instructions. If the RISC chip is fast enough, it can still process complex instructions as fast or faster than CISC chips.

SPEC—System Performance Evaluation Corp. SPEC is a benchmark that compares the performance of microprocessors based on things like floating-point operations and creates a ratio of their performance in order to compare their processing power.

VL-Bus—VESA Local-Bus. A local bus standardized by the Video Electronics Standards Association (VESA) that connects directly to the CPU and is one of the fastest available local bus standards. ●

486

Intel Corp. introduced the 486 generation of microprocessor in 1989. This microprocessor is designed to operate IBM and IBM-compatible computers, and any of the software programs written for DOS, Microsoft Windows, UNIX, and OS/2 operating systems.

Intel's first line of 486 microprocessors included an extra processor on the chip called a **math coprocessor** (also referred to as a **floating-point processor**). It helped the 486 process mathematical and graphical functions more quickly than previous generations of microprocessors, and could run at clock speeds of 25MHz, 33MHz, or 50MHz.

However, in 1991, Intel began offering a toned-down version of the 486 chip that was less expensive than the original version. It did not include a math coprocessor and ran a little slower, with clock speeds of 16MHz, 20MHz, 25MHz, and 33MHz. To help consumers distinguish between the two 486 chips, Intel added the "SX" suffix (486SX) to the toned-down 486 model. The original version with the math coprocessor was called the 486DX.

A year later, Intel introduced another addition to the 486 family, the 486DX2. David Hinz, senior technical marketing engineer at Intel, says the 486DX2 chip was designed to execute codes twice as fast as the ordinary 486DX chip. The DX2 chip, Hinz says, works faster because of **clock-doubling**, operating at clock speeds of 40MHz, 50MHz, and 66MHz. Intel increased the internal clock rate (not the bus size) of the DX2 chip, while the external processing rate remained the same.

That wasn't the end of the 486 generation. Intel added one more processor, the 486DX4, to that family in 1994. Hinz said Intel tripled the internal clock speed on this chip, making its internal operation even faster than the 486DX2. The 486DX4 reached clock speeds of 75MHz and 100MHz.

To see how each of these microprocessors compares when performing similar tasks, see Intel's iCOMP Index located in "The Makings Of A Microprocessor" in this issue of *PC Novice*.

Like their predecessor the 386, all 486 chips have a 32-bit data bus and can internally process 32 bits of information inside the CPU. However, the 486 more than doubles the processing power found on the 386DX microprocessor due to the 486's architecture, higher speeds of data transfer, and other special features.

PHOTO COURTESY INTEL CORP.

The 486 chips were the first Intel chips to incorporate cache memory on the chip. **Cache** is a memory area placed on the processor allowing it to act on frequently used data without spending the time to consult other computer components. The 486SX, 486DX, and 486DX2 all include eight **kilobytes** (KB) of cache on the chip, while the 486DX4 includes 16KB. (A kilobyte equals about 1,000 bytes.)

The 486 chips were also the first to include a "RISC-like" core. Previously, Intel's microprocessors used a **Complex Instruction Set Computing** (CISC) core, which recognized and computed a large number of complicated computer instructions. The complexity of these instructions, however, occasionally causes CISC chips to have a slightly slower performance than RISC chips. The design of **Reduced Instruction Set Computing** (RISC) chips is based on the concept that most computers use only a few simple instructions most of the time. Thus, RISC chips execute those few instructions faster. The 486's RISC-like core is similar to RISC-chip design in that the core executes frequently used instructions quickly in a single clock cycle.

Hinz says Intel 486 chips are equipped with **SL technology** that complies with the Energy Star Program administered by the U.S. government. This technology allows computer manufacturers to build a power-down option into their computers to lower the power usage when a computer is not in use.

Intel is no longer the only producer of 486 microprocessors. Many companies, such as AMD and Cyrix, make similar 486 chips i several systems. Compaq, a leading manufacturer of IBM and IBM-compatible computers, gives customers the option of buying a 486 system with an Intel chip or an AMD chip.

Currently, the entry-level microprocessor for buyers is the 486DX2, which sells for around $1,500, depending on the extras bundled with the computer. With the price of more advanced microprocessors rapidly plummeting, you probably won't be offered any 486SX or 486DX computers. You may find only a few 486DX4 computers, Hinz says, but you can soon expect them in volume for pretty competitive prices as Intel begins to launch the product in the desktop personal computer market.

Most 486 microprocessors are upgradeable. To upgrade them to Pentium power, they need to be Intel Verified Pentium Upgradeable, a logo that should be displayed on the computer box. Intel's 486 chips can also get a mid-life boost with an OverDrive processor. Although it will not move the processor's power up to the next generation, an OverDrive processor will make it operate faster and more efficiently. (For information about upgrading 486 chips by other vendors, see "Alternative Options" in this issue of *PC Novice*.) ●

by Cindy Krushenisky

Pentium

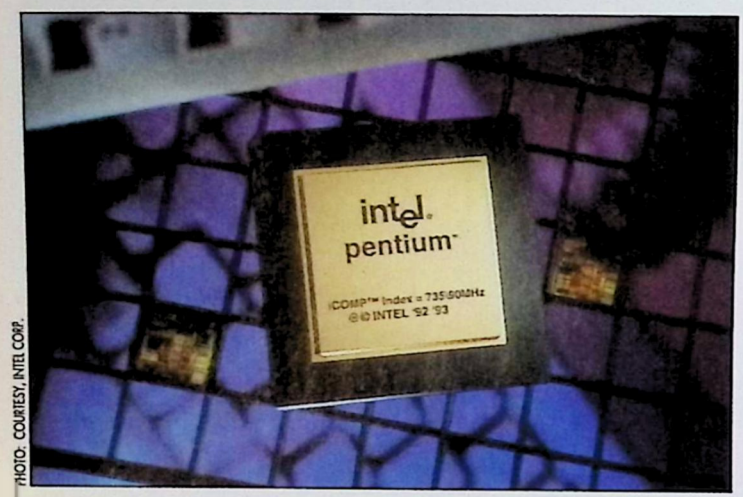


PHOTO: COURTESY, INTEL CORP.

In 1993, Intel Corp. introduced the Pentium, its "586" line of microprocessors. The Pentium processor is currently the most powerful processor Intel offers for the personal computer.

The Pentium is designed to operate IBM and IBM-compatible computers and any of the thousands of software programs written for DOS, Microsoft Windows, Unix, and OS/2 operating systems. It's best at operating some of the most advanced software applications, including the growing number of multimedia and graphically oriented programs that require a lot of processing power.

David Hinz, senior technical marketing engineer for Intel Corp., says the newest version of Microsoft Corp.'s Windows, officially named Windows 95, has been specially enhanced to operate on the Pentium processor. According to Hinz, this means the next generation of Microsoft Windows and applications written for that environment will operate best on a Pentium—better than any 486 processor.

The size of the Pentium data bus has not changed much from Intel's previous line of microprocessors. The Pentium has a 32-bit data bus, passing along 32 bits of information to other computer components to tell them what to do. However, the amount of information the Pentium can process internally through buses in the chip has increased to 64 bits. In other words, the Pentium can transfer more information and operate faster internally than it can transfer information to other parts of the computer.

Originally the Pentium was introduced with two clock speeds of 60MHz and 66MHz. Intel later introduced Pentium processors with faster clock speeds of 90MHz and 100MHz. Just recently, Intel introduced a 75 MHz Pentium processor that Intel promises to be twice as fast as the 486DX4 operating at 75MHz. Each of these Pentium processors has a different level of processing power. To see how they compare while performing similar tasks, see the iCOMP rating in "The Makings Of A Microprocessor" in this issue of *PC Novice*.

Like the 486 processors, the Pentium processors include a built-in cache on the chip. However, the Pentium includes 16KB instead of the 8KB found on most 486 microprocessors. This 16KB of cache is divided into 8KB of data cache and 8KB of code cache. These two types of cache increase the processor's performance by doubling the width and reducing conflicts within the cache.

Hinz says the Pentium has become more RISC-like than the 486. While the 486 executes frequently used instructions quickly in a single clock cycle, the Pentium executes frequently used instructions even more quickly, processing more than one instruction per clock cycle.

New **superscalar technology** lets the microprocessor move the information much faster. Multiple data "pipelines" let the microprocessor do more than one thing at a time. Hinz uses the analogy of stairways going from one floor to another, in which one stairway holds one person, or one item, at a time. Think of the multiple data pipelines as several stairways being used to speed up the flow of information.

Another new technology, called **branch prediction**, also speeds up processing. "Computer code is kind of like driving down a street," explains Hinz. "As you execute computer code, often there is going to be a corner where you have to make a decision. 'Do I have to go right, left, or straight?' Branch prediction," says Hinz, "tries to predict how you are going to go and ensures that the processor has the information all ready to go, so where you turn right, it is ready to turn right."

The Pentium has an even better math coprocessor on the chip than the 486 models. The coprocessors are designed with a sophisticated pipelining scheme so they'll execute floating-point instruction five to 10 times faster than an Intel 486DX microprocessor running at 33MHz.

Intel is the only maker of the Pentium processor at this time. Other chip makers are developing their own 586-type chips, but none are using the Pentium name. (For more information, see "Alternative Options" in this issue of *PC Novice*.)

Prices for Pentium processors are dropping quickly. Debbie Hoffman, Intel's channel marketing manager for the Pentium processor group, says you can purchase a Pentium with a 60MHz clock speed for less than $2,000, depending on the extra options bundled with Pentium systems. The 100MHz systems are a bit steeper in price, available with all the extras for around $4,000, according to Hoffman.

Upgrading the Pentium processor is somewhat limited. In early 1995, Hoffman says, Intel will introduce a line of Overdrive chips to upgrade the Pentium line. These Overdrive chips won't make the Pentium chips into 686-like chips, but will give them a mid-life boost to operate faster and more efficiently. ●

by Cindy Krushenisky

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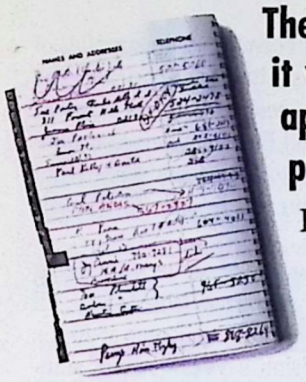

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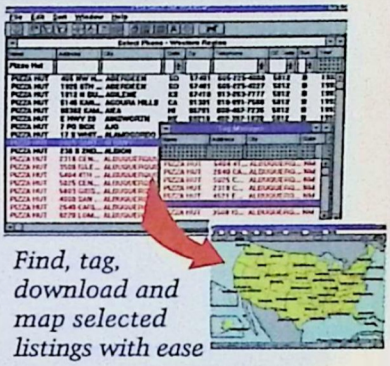

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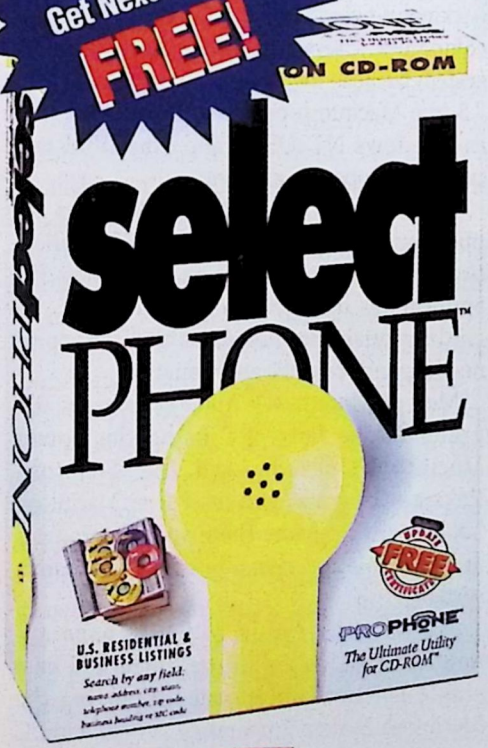

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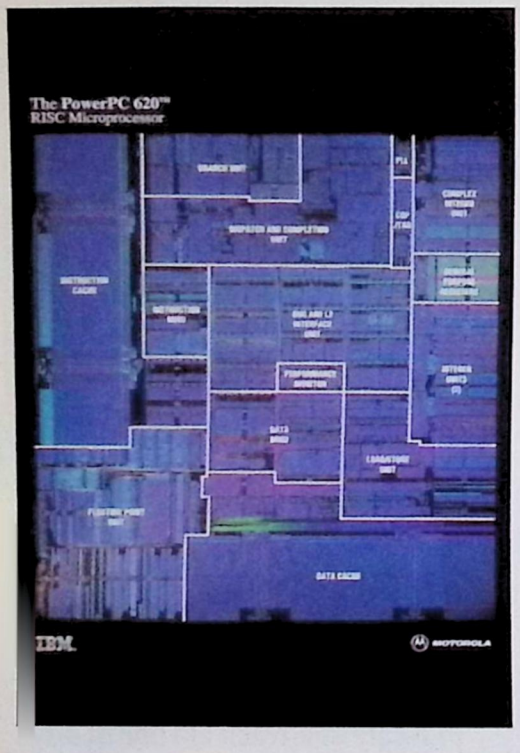


Apple Computer Inc., IBM Corp., and Motorola combined forces in 1991 to announce the PowerPC architecture. Their goal was to develop four different PowerPC microprocessors, the first of which was the 601, introduced at the end of 1993.

The PowerPC 601 microprocessor was targeted toward desktop computing. Its combination of low price and high performance gave the 601 a comparable advantage over other microprocessors. At 100mm square, the physical size of the PowerPC 601 is very small—less than half the size of the Pentium chip from Intel. This smaller size helps reduce the cost of manufacturing the chip and makes it more affordable for desktop consumers.

Even at a low cost, the PowerPC microprocessor delivers high levels of performance. The 601 initially ran at clock speeds of 50MHz and 66MHz, but now runs as fast as 80MHz to 100MHz. It can execute up to three instructions per cycle, and has 32KB of on-chip cache.

The PowerPC 603 and 604 microprocessors were announced in 1994. Like the 601, the 604 is geared toward desktop systems but is used in network servers as well. The 604 also offers high performance, with even more advanced features than the 601. For example, the 604 has six independent instruction execution units so more instructions are processed per clock cycle. It also has larger caches than the 601.

The PowerPC 603 is designed for energy-efficient systems, such as portable computers and "green" computers, which are set up to conserve power. The 603 runs on extremely low power levels. While running at 80MHz, for example, the 603 uses only a little over two watts of power.

The latest in the line of PowerPC microprocessors is the PowerPC 620. Samples of the first 620 will be available in the first half of 1995 with actual models to be sold during the second half of the year.

The 620 is intended for the very high-end workstation and network-server market. It's being designed for use with complex applications that require intensive processing capabilities. Several features will be incorporated into the 620 to give it high performance. It has a high-speed memory interface to support multiple transactions. The 620 not only has large internal caches, but an external cache bus as well.

All PowerPC microprocessors are built upon a 64-bit RISC architecture for instructions to be carried through as swiftly as possible. A RISC processor runs shorter and simpler instructions so they can be executed faster.

Other techniques called pipelining and superscalar execution increase the performance of RISC microprocessors by allowing more than one instruction to be executed at a time. Instructions are broken into equal segments and executed using pipelines that process instructions in stages, resulting in faster processing. Superscalar technology builds several execution paths so that a machine can start more than one instruction during every clock cycle. For example, a two-way superscalar system can sustain up to two instructions per clock cycle. There are also four-way superscalar systems.

So far, Apple has been the main supplier of computer systems that incorporate the PowerPC microprocessor with its lines of Power Macintosh and Performa personal computers. Power Macintosh systems range from $1,819 to $6,379. You can find Performas for $2,600 to $2,900.

If you're a PC user, you may be wondering when the PowerPC will be available to you. Jill Mullan, product marketing manager at IBM's microelectronics division, says IBM is now shipping workstations and network servers that are based upon the PowerPC. In 1995, she says, the product family will extend into the mainstream desktop market. A number of third-party PC vendors also have adopted the PowerPC architecture. We should see more PowerPC-based systems on the market in the near future.

When it comes to software support, the PowerPC has a great advantage. With Apple and IBM behind it, the PowerPC has the backing of two of the world's largest computer companies. Users can choose their operating system because the PowerPC supports System 7.5 (the Macintosh operating system), as well as Windows NT, OS/2, and other IBM and compatible operating systems.

The PowerPC runs DOS and Windows applications and Macintosh System 7 applications. In addition, there are more than 350 applications optimized for the PowerPC, including business, home, publishing, engineering, and scientific applications.

Most current users of Apple systems can upgrade to the PowerPC using the Power Macintosh Upgrade Card, the Macintosh Processor Upgrade, and the Power Macintosh Logic Board Upgrade. These upgrade products are available for virtually every Macintosh system.

Mullan says Apple and IBM have announced that, in the future, there will be a single hardware platform supporting the Macintosh System 7 operating system and PC operating systems, such as Windows NT and OS/2, for the PowerPC. ●

by Jennifer Larson

Motorola

High Performance Series

Motorola's 68000 series of microprocessors was introduced in 1979 with the original 68000 microprocessor. Others in the series, introduced at two- to three-year intervals, include the 68010, 68020, 68030, 68040, and the latest model, the 68060.

When introduced, the original 68000 ran at only 8MHz. Subsequent 68000 chips operated at 16MHz with 24-bit data buses. The 68010 was about 15% faster than the original model at around 12MHz. Today, few 68010s are still being sold because they're fairly out-of-date.

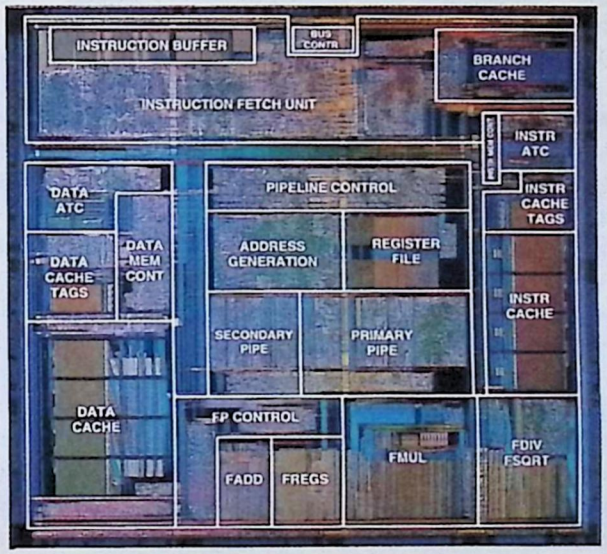
The 68020 was the first model in the Motorola microprocessor family with a 32-bit external bus, and thus higher performance. Today the 68020 runs at 33MHz and has a 256-byte cache. The 68030, which also has a 32-bit bus, runs at up to 50MHz and has a 4KB cache. The 68040 is available at up to 40MHz and has a 4KB cache. There is no 68050 in the series.

The newest microprocessor in the High Performance series is the 68060, which is just beginning to ship. The 68060 runs at up to 60MHz, has an 8KB cache, and incorporates superscalar technology, which enables systems to start multiple instructions during one clock cycle to speed up processing. The performance of the 68060 is comparable to the performance of the PowerPC 601 and 603 microprocessors.

Beginning with the 68030, all the microprocessors in the series have incorporated on-chip memory management units. The 68040 and 68060 have floating-point processing, allowing the microprocessor to work with floating-point numbers and other mathematical equations more easily. (Floating-point numbers represent numbers ending in many zeros.)

Initially, the 68000 microprocessors were used heavily in engineering workstations.

Motorola's 68060
Microprocessor



Then in the mid-1980s, Apple Computer Inc. adopted the 68000 microprocessor architecture, and it basically became the "heart and soul" of the Macintosh product line, says Roy Druian, marketing manager at Motorola. Today Apple continues to ship Macintosh machines that are based on 68000-series microprocessors.

The 68000 series of microprocessors used in desktop systems is primarily based on the Apple product line. Apple recently introduced a series of desktop computers known as the Performa 600 series, which is based on the 68040. The Apple Powerbook 500 series of notebook computers is also based on the 68040. The prior Powerbook series was 68030-based. There are even some 68030-based Performas that are still shipping. But overall, Druian says, Apple is phasing out its 68030 product line with the 68040 line, and probably won't announce any desktop products based on the 68060.

"Essentially," Druian says, "this current series of Macintosh products that's based specifically on 68040s is sort of going to be the end of [68000-series] support [in desktop systems]."

Though the 68000 series has been the core of desktop Macintosh computers for some time, this family of microprocessors has shifted away from the desktop-computer market into what's commonly referred to as the embedded-systems marketplace. Embedded systems include things like laser printers, modems, telecommunications products, and other such devices that utilize microprocessor chips, but are not desktop computers or network servers.

Druian says many 68020s are shipping today in items such as laser printers and copy machines. You're not aware that there's a 68020 microprocessor in the machine, but there are plenty of them still on the market.

Just because the 68000 series is moving completely into embedded systems doesn't mean Motorola will be out of the desktop-computer market. That's where the PowerPC comes in. Apple has made it known that it's moving its desktop product line to the PowerPC. The migration from 68030s and 68040s to the PowerPC will be gradual. You'll still see some Macintosh desktop computers with 68000-series microprocessors in them for awhile. To aid the migration process, however, Apple is selling PowerPC upgrades for many of its 68000-based products.

Since Motorola has a part in the PowerPC, it has room to go elsewhere with the 68000 High Performance series.

"It's not really our focus to serve the desktop market with [the 68000] family," Druian says. "Our real focus is to establish the PowerPC into that desktop range." The 68000 family is more geared toward serving the users of embedded systems. ●

by Jennifer Larson

Alpha

Digital Equipment Corp. introduced and began shipping the first Alpha microprocessor in 1992. Since that time, Digital has focused on performance, successfully maintaining some of the highest performing and fastest microprocessors on the market.

The Alpha microprocessor line consists of two basic versions: the 21064 (the original Alpha) and the 21164. Within these two designs, a range of different clock speeds are available.

In addition to the 21064, there's the 21064A microprocessor. The 21064 runs at 150MHz to 200MHz, and the 21064A runs as fast as 275MHz. Both microprocessors have a 128-bit data bus and up to 32KB of on-chip cache.

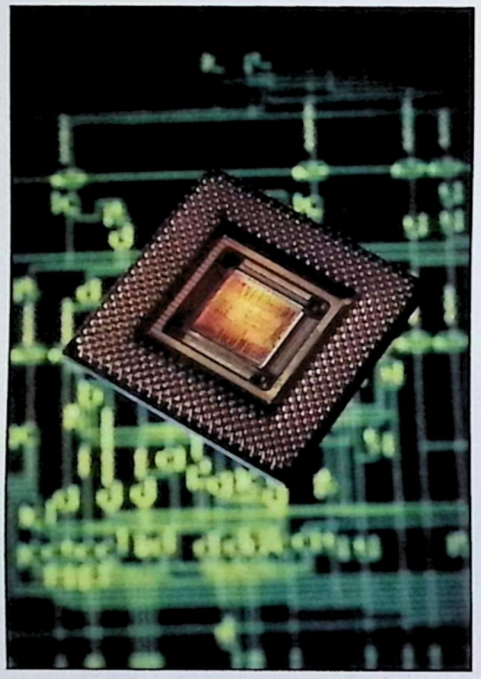
The 21164 is an even higher-end microprocessor that runs as fast as 300MHz. It has a 128-bit data bus, 8KB of on-chip cache, and an additional 96KB of second-level on-chip cache. The 21164 is the first microprocessor to surpass one billion instructions per second, greatly improving performance.

In addition to on-chip cache, Alpha microprocessors also support caches outside of the microprocessor. The 21064, for example, is capable of supporting between 128KB and 16MB of cache.

Alpha microprocessors use a RISC architecture, which assimilates relatively simple instructions very quickly to result in faster processing. This architecture includes features such as superscalar and superpipelining to improve performance.

Superscalar technology builds several instruction paths. A superscalar machine can actually start more than one instruction every clock cycle to go beyond the one instruction per clock cycle barrier. The 21064 is a two-way superscalar microprocessor, and able to issue two instructions per clock cycle. The 21164 is a four-way microprocessor, issuing four instructions per clock cycle.

Superpipelining is a technique for making the pipeline itself, which executes the instructions. Superpipelining makes the pipeline run at higher clock rates for faster processing.



The Alpha is used in many different types of systems, including high-performance personal computers, workstations, network servers, and even mainframe systems. It's also used in multiprocessor supercomputers. Digital Equipment Corp. builds everything from Alpha personal computers to large mainframe machines.

Do not, however, expect to find the Alpha in any typical home desktop computers as it is a very powerful processor that's designed for high-end systems. These higher-performance systems also carry a higher price.

Aaron Bauch, strategic marketing manager for Alpha microprocessors at Digital, says that because the Alpha is focused on performance, it falls into a different market than the home systems many consumers are looking for.

"Alpha systems basically start where the high-end personal computers leave off," Bauch says. For example, an entry-level Alpha system would be similarly priced to a high-end system that uses a Pentium processor, costing around $3,000 to $4,000. You're not going to find an Alpha system for $900 or less. But at the same price as a higher-end desktop computer, Bauch says, you'd get much better performance from the Alpha.

Systems incorporating Alpha microprocessors are used more for business and professional solutions than in the home market. Network servers, mainframe computers, and workstations are found in a variety of business environments. While high-performance desktop computers may be found in some homes, they're most likely being used for business purposes and complex applications.

Alpha microprocessors are equipped to handle more than 5,000 high-end applications, working in such operating systems as Windows NT, OSF/1, and OpenVMS. People doing very computational-intensive jobs will benefit from the performance of an Alpha microprocessor. Such applications include engineering, image work in publishing, preparing package designs, or laying out printed circuit boards for designing computers.

Alpha microprocessors are also found in systems that are used to create computer-rendered graphics for commercials. These images are created one frame at a time and then run at a particular number of frames per second to create motion video. The Alpha environment is outstanding for that, Bauch says.

If you're in the market for a home computer and you're on a budget, the Alpha is probably not for you. But if you're looking for a high-performance computer that can take on the most complex applications for your business, the Alpha is probably just what you're looking for.

In terms of upgrading, high-performance systems like those powered by Alpha microprocessors have a key advantage. If you buy a system with just enough performance for your purposes today, you will soon bypass your current level and will need to upgrade. But if you purchase an extremely high-performance system today, it will benefit you much longer. You may still have enough power to handle your high-end business applications up to three years from the time you buy your computer. ●

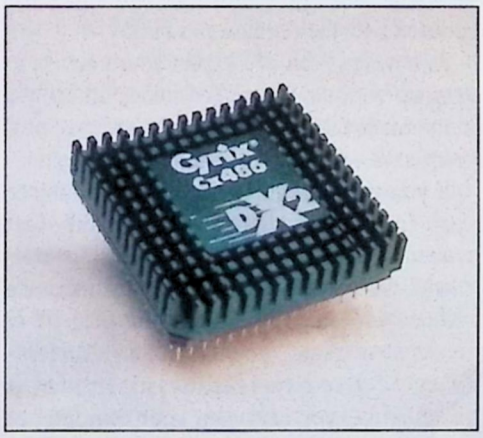
by Jennifer Larson

Alternative Options

The Intel microprocessors used in most IBM and compatible computers have become a standard that other companies follow to create microprocessors of their own. Two such companies are Cyrix Corp. and Advanced Micro Devices Inc.

Cyrix Corp. followed the Intel design to create its family of microprocessors, which have been shipping since 1992. Cyrix microprocessors are fully compatible with hardware and software designed for Intel chips. The most current Cyrix products are the Cx486DX2s.

The Cx486DX2 desktop systems have a 32-bit data bus and are available at speeds of 50MHz, 66MHz, and 80MHz. Systems come in both five- and three-volt versions. The three-volt microprocessors run at lower power, consuming less than half the power of standard five-volt processors. This and other power management features, such as the System Management Mode, are designed for today's energy-efficient desktop computers, otherwise known as "green" computers.

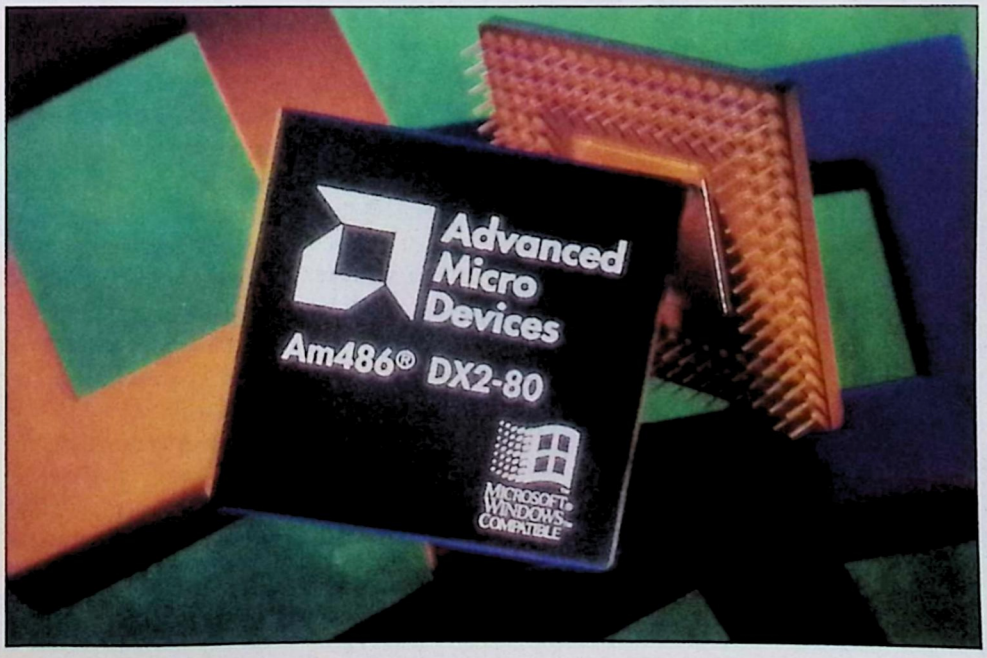


Other features of Cyrix microprocessors include the floating-point unit, which is a coprocessor that handles complicated numbers and mathematical equations. The Cyrix integrated floating-point unit is 10% faster than that of the Intel 80486DX.

Cyrix microprocessors also have 8KB of on-chip write-back cache. Write-back cache is designed to significantly improve performance in systems that do not have second-level cache, or those that only offer second-level cache as an option.

Although it incorporated special features to create its own design, Cyrix followed Intel's architecture to maintain compatibility. Cyrix microprocessors are fully compatible with DOS, Windows, OS/2, Unix, and Novell NetWare applications. Systems that operate on Cyrix microprocessors run all of the software that Intel-based systems use.

The newest endeavor by Cyrix is the M1 architecture. This 586-type microprocessor uses superscalar and superpipelining technology to obtain the fastest processing possible. It has a 64-bit data bus, more than 16KB of cache, and an on-chip floating-point unit.



Chips using the M1 architecture incorporate the same power-management features and the Cx486DX2 chips, including 3.3-volt operation.

The M1 product family will be designed for the high-end business and consumer markets, as well as dual-processor desktop systems. Production should begin in early 1995.

Another manufacturer of Intel-type microprocessors is Advanced Micro Devices Inc. (AMD). AMD has been shipping microprocessors since 1982 and has a 486 design with the Am486DX2.

Running at 80MHz, the Am486DX2 is designed for the desktop, personal computer use of both business and home applications. The model is designed to increase performance over typical desktop and home computers, which often run from 40MHz to 66MHz.

AMD's 486 chip provides the power needed to run complex graphics, desktop publishing, and multimedia software. Any Windows application can run on this microprocessor.

Another version of the Am486DX2 is the Am486DXL2, which includes System Management Mode and processor clock control to manage system power more efficiently, and to comply with "green" PC standards. When the computer is on but not in use, system power can be reduced to less than 30 watts.

AMD's newest architecture is the Windows-compatible K86 family, code named K5. K86 microprocessors are built upon a RISC architecture that can execute four instructions per clock cycle.

While AMD intended to begin production on K5 microprocessors early this year an injunction filed by Intel over AMD's unlicensed use of some programming will no doubt delay the K5's release.

Processors using the K5 architecture are fully compatible with software applications for Windows and even Windows 95, the Microsoft operating system written for future Intel-based and compatible architecture. ●

by Jennifer Larson

Buying To Last

After reading all the technical jargon and specifications of today's microprocessors, you're probably wondering which one's the best buy and what's going to last.

Unfortunately, no matter what system you purchase, it's not going to be the latest and greatest forever.

The Pentium won't remain on top of the Intel heap too much longer, says Dominic Ricchetti, director of advanced desktops for the Dataquest research group. He says Intel not only will introduce 120MHz and 150MHz Pentiums in 1995, but will most likely introduce the next generation of processors, code-named the P6, around the middle of 1995.

The current leading force in the PowerPC line, the PowerPC 601, operates at speeds of 60MHz to 80MHz. This powerhouse will be replaced by the 604 chip running at 100MHz or 150MHz. The upcoming PowerPC 620 microprocessor will be a true 64-bit processor that will knock the socks off both the Pentium and the P6.

So how long can you expect your new PC to keep up with the times? Ted Julian, an analyst in International Data Corp.'s PC Hardware program, says it depends on what you want to do.

If you want the very best and are willing to pay for it, your system can probably last about three years. If you are an average user who wants to organize your finances, use educational software, and play a few games, you are looking at a four- to five-year investment. Or, if you just want your computer to do basic communication tasks and word processing, you can hold onto it even longer.

The Best For Your Buck

However, you still need to take a good look at the type of computer you buy. Microprocessors can largely vary when you consider which one has the best lasting power for the price you pay.

Consumers are finding that computers with entry-level 486DX2 microprocessors are an exceptionally good buy. Most of the home market is very pleased with the 486DX2, even with the demands of multimedia applications, Ricchetti says. You can

find 486DX2 systems for as low as $1,000 or $2,000, and up to $1,800 for a full-fledged, brand-name multimedia system. That includes systems with "Intel Inside" microprocessors, or 486 microprocessors produced by companies such as Cyrix or AMD.

However, Pentium systems are not far out of reach. Julian says some 60MHz Pentium systems, including CD-ROM and speakers, sell for around $2,000. Historically, he says, the top-of-the-line systems have started around the $4,000 to $5,000 category.

"Clearly Intel is trying to persuade people to buy Pentiums by pricing them extremely well," he says. "And in that sense, considering that the Pentium is state-of-the-art, top-of-the-line, and really hasn't been out that long, the pricing for a cutting-edge PC is as good as it has been."

In addition, the long-awaited Microsoft Windows 95 (Windows 4.0) operating environment will soon bring numerous applications enhanced to run optimally on the Pentium platform. Applications for Windows 95 will be able to take advantage of the 32-bit processing in the Pentium, while early versions of Windows only operated at 16 bits, Ricchetti says.

On the other side of the coin, the Apple market seems to be experiencing a similar situation as newer architectures replace the old.

Motorola's 68040 systems, which always have been the average Apple consumer mainstay, are being priced from $1,200 to $2,000, depending on extra features packaged with the systems.

However, Apple's PowerMac systems with the 601 PowerPC chip also seem to be priced competitively. The 6100 series ranges from $1,819 to $2,499, depending on the extras bundled with the system. The 7100 series is priced from $2,899 to $3,699, and the 8100 series costs between $4,250 and $5,380.

"They're something worth considering since Apple has been up-front and said 'This is the architecture of the future. We will be moving away from 68040s and moving to the PowerPC,'" Julian says. "So that's a pretty strong statement in my mind that many people should give the PowerPC a serious look."

There may not be as many applications written for the PowerMac. (About 360 or so, according to Apple.) But, he adds, there are more all the time. The same way Apple has committed to the PowerPC, software developers will need to follow suit. So even though some software companies don't have PowerPC applications yet, you can rest assured that they're working very hard to make those available.

If you are an average consumer wanting a computer that keeps up with the newest applications and games, your decision lies between two types of systems—the Pentium vs. the PowerMac.

Keep in mind that with some extra software, you can run all of your IBM-compatible software programs on the PowerMac, too. In fact, the PowerPC takes great advantage of Microsoft Corp.'s Windows NT, which is a full-fledged operating system that transfers 32 bits at a time, and other applications written for this operating system.

Chip manufacturers of other microprocessors constructed for the IBM and IBM-compatible market, such as the M1 and K5, feel their microprocessors have a fighting chance, Ricchetti says, as these manufacturers can achieve the same or better performance as the Pentium at a lower price.

Now, however, may not be the time to buy these microprocessors. They're just starting to be introduced to consumers.

"We will have to wait and see as those systems hit the market and get tested this year," Ricchetti says. The market for these microprocessors probably will take the first half of 1995 to really develop.

It may not be the right time to purchase a system with an Alpha microprocessor either, if you're an average consumer. Ricchetti says the Alpha is maintaining the lead performance and gives you the best bang for your buck. However, only high-end technical users may be able to take full advantage of all that computing power, and they may be the only ones willing to pay the $4,000 to $12,000 to purchase one of these systems.

It seems that if you are an average consumer who wants your new computer to keep up with the newest applications and games for the next three to five years, your decision lies between two types of systems—the Pentium vs. the PowerMac.

The Pentium is an extremely well-priced, top-of-the-line, IBM-compatible product that has proved itself in the market, and will be able to optimally run the new Windows 95 operating software when it is unveiled.

The Power Macintosh is the wave of the future that is here today for the Apple line. It can run both Macintosh software and software for IBM and compatible computers, especially those written for Windows NT.

Apple is pushing the PowerMac's software advantage over the Pentium. But, Ricchetti says, this is not really a major selling point for IBM and compatible users. Programs running on the DOS or Windows environment will operate through a software emulation approach at a much slower speed. Apple specifications say that the PowerPC chip will operate as a 486DX2/66 when running IBM and compatible software. And until a PowerPC system is introduced primarily for typical IBM and compatible users, the PowerMac is the only "dual" system out there.

"It's really a decision over the Macintos operating system of the Microsoft Window environment," he says. "You shouldn't buy a Power Macintosh system to run Windows applications as a primary requirement. It should only be a secondary thing."

Back To The Beginning

Your decision all comes down to the same choice you made several years ago between Apple and IBM and compatible computers.

Take into consideration the computing environment you're already working with. Are you a student? If so, what environment is the college or university using? Or, what type of system is your office using? You already know how to work in that environment, and often times you may have to use similar programs and exchange files. That's something that is going to tilt the scales in one direction or another, Julian says.

Julian suggests you also consider the software you will be using.

"Take a look at the kinds of applications that are out there [for each type of PC]," he says, "then see how it matches up with what you want to do." ●

by Cindy Krushenisky

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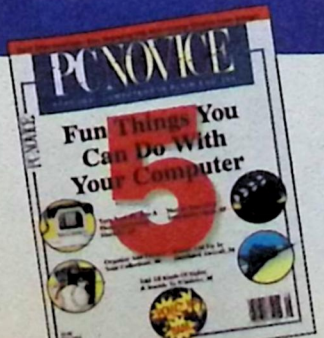

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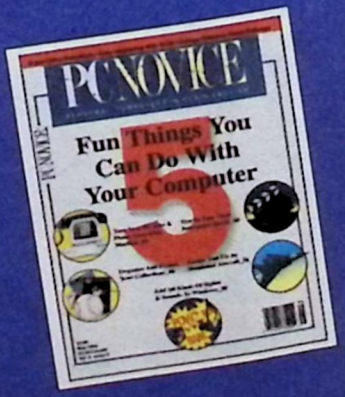
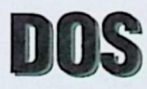


The Computer's Unsung Hero:

Its Operating System

Your computer's operating system is similar to a football offensive lineman: No one notices him until he commits a holding penalty, then *everyone* pays attention. When things are running smoothly, the quarterback gets all the credit and the lineman becomes anonymous again.

Most computer users behave the same way. As long as the computer is working properly, the operating system is ignored. The first appearance of an error message, however, draws your attention...and your ire. Those error messages generally are few and far between, though. Despite an occasional flaw, the operating system performs its tasks solidly, especially considering how many types of software and hardware it controls.



The **operating system** (OS) ultimately controls all aspects of your PC. Software must be written to work with a particular operating system. You can think of different operating systems as speaking different languages. That's why a computer using the Macintosh OS can't operate programs designed for DOS without special translation software, just like a Spanish-speaking person can't read German without a translator.

For now, three operating systems are marketed for use with the majority of personal computers—DOS, OS/2, and Macintosh. Microsoft Windows 3.1 isn't an operating system, even though it has many similar properties. Windows is called an **operating environment** because it requires DOS. The Windows 95 upgrade, which is the fourth product we'll discuss, will be an operating system.

DOS

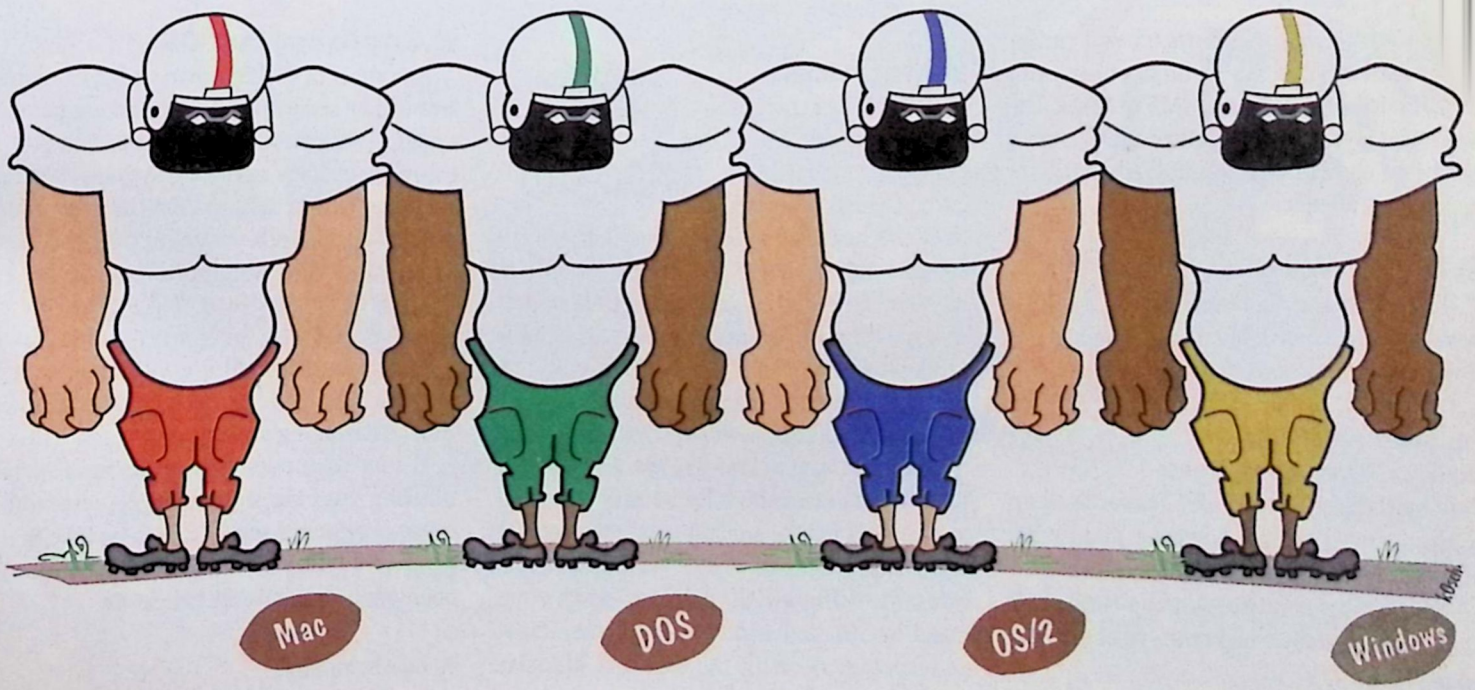
DOS is most likely the foundation running your PC. DOS, or disk operating system, is software used to operate your IBM-compatible computer. DOS uses a **text-based interface** in which you type commands at the system prompt.

DOS was introduced by Microsoft Corp. in 1982. The operating system is more restrictive than the other operating systems because of its 11-character limit on filenames, its text-based interface, and its memory and 16-bit processing limitations (which we'll discuss later), but it will give you stability. The original DOS didn't recognize a hard drive and didn't allow subdirectories, but DOS has added many features over the years, such as network usage, the DOS Shell (a graphical interface), and some memory management capabilities.

Despite its problems, DOS continues to be the most widely used operating system. If you have an older IBM-compatible computer, DOS probably is the only operating system you can use because of microprocessor and random-access memory (RAM) limitations. Whether DOS can survive the push from the flashier and more powerful operating systems remains to be seen.

Windows 95

Whether you call it Windows 4.0, Chicago, or Windows 95, Microsoft's upgrade to Windows 3.1 is clearly the most awaited software release for IBM-compatible computers in history. The anticipation is one reason it seems as though Windows 95 (as the upgrade is officially named) will never be released. Rumors have circulated for about 18 months on its release date, but Microsoft has announced that Windows 95 will ship in mid-1995.



Windows 95 will have numerous improvements from Windows 3.1, the biggest of which is its migration into a full-fledged operating system. Windows 95 is expected to run all software designed for Windows 3.1 and DOS, and Windows 95 versions of most popular programs will be developed.

One of the best Windows 95 features is true multitasking support, giving you the ability to run background programs and actions simultaneously with a program in the foreground with virtually no loss of performance.

Windows 95 will take advantage of powerful 32-bit applications, too. Beginning with the 386, computers were built on a 32-bit processing platform. Older computers, such as the 286, have a 16-bit processing platform. Because DOS was written for older computers, it is a 16-bit operating system, which limits its performance. Windows 95 can run both 16- and 32-bit software packages. (OS/2 and Macintosh are also 32-bit operating systems.)

The new operating system will work with the plug-and-play standard, allowing easy installation of new hardware devices. The standard will identify and locate new hardware devices automatically. Because it supports improved pen input and connections via modem, Windows 95 will be a boon for portable computer users.

A more intuitive graphical user interface (GUI) than Windows 3.1 and unrestricted filenames are further advantages of Windows 95. Windows 3.1 required the same filename limitations as DOS. (A GUI allows you to use icons and menu commands to interact with the computer.)

Microsoft claims Windows 95 will run at least as fast as Windows 3.1 on machines with 386DX microprocessors and 4MB of RAM. The operating system will require much better hardware and RAM to take full advantage of its features, though.

OS/2 Warp

When IBM and Microsoft developed OS/2 in 1987, it was expected to take control of the IBM-compatible computer world the way Windows 3.0 actually did when it was introduced in 1990. OS/2 never lived up to its advanced billing, however, mainly because its system requirements far outweighed the computing resources of the time, and Windows eventually caught the eye of a public looking for a GUI.

IBM hasn't given up on OS/2, though. The company released OS/2 3.0, which is called Warp, late in 1994. The company is hoping the upgrade will fill the void for PC users looking for a full-fledged GUI operating system and tired of waiting for Windows 95.

OS/2 is a 32-bit operating system that can run OS/2, DOS, and Windows 16-bit or 32-bit software. IBM claims the operating system runs on 4MB of RAM, but it won't run as smoothly as possible. At least 8MB of RAM is more realistic, and some high-end users may need 16MB of RAM.

One of Warp's top new interface features is the LaunchPad, which provides easy access to commonly used objects. A number of built-in features designed exclusively for OS/2 are part of Warp, including Internet access, IBM Works (with word processing, spreadsheet, database, and personal information manager programs), and a fax package.

When running DOS and Windows software during multitasking under OS/2, the operating system treats each program in an individual session, meaning if one of the programs crashes, it won't cause the entire system to crash.

OS/2 is a solid operating system, but suffers from a lack of native software applications compared to Windows, DOS, and Macintosh. IBM says more than 2,000 native OS/2 applications are available, but you'll have a hard time finding them on store shelves. Only a few computer manufacturers preload OS/2 onto their IBM-compatible computers.

Macintosh

A number of changes are occurring at Apple Computer, and the Macintosh Operating System is at the heart of a few of the changes. In September 1994, Apple released an upgrade to its Mac OS, called System 7.5. Apple hadn't changed the main features of its Mac OS in three years prior to 7.5's release. Apple says System 7.5 will improve the speed with which your system handles basic tasks over System 7.1.

Since its introduction in 1984, the Mac OS has always been known for its easy-to-use interface (and for the smiling computer you see at startup). Many of Windows' popular features, including a GUI, drag-and-drop, command menus, and windows, came into initial widespread use with the Mac OS. Mac has always featured the plug-and-play standard for configuring hardware.

System 7.5, which is included on all new Mac and PowerMac computers, increases the ease-of-use factor for which Mac is known. The operating system offers compatibility with DOS, OS/2, and Windows files and diskettes. With the PowerMac and special software, you can run Windows and DOS programs on your Mac computer.

The OS incorporates a Launcher feature that allows you to place frequently used programs and documents inside a window where they can be accessed with a button click. The Launcher has been available on Performa-brand Macs running System 7.1.

Older Macs won't work with System 7.5 unless you've put them through a memory upgrade. You'll need 8MB of RAM to fully run System 7.5 on a regular Mac while 16MB of RAM is recommended on a PowerMac.

The major downside to the Mac OS is the small number of software choices available for it compared to DOS and Windows. The lack of available Mac software doesn't mean you can perform many more tasks on IBM PCs than on Macs; it means you won't have as many brands of software from which to choose.

More computers bearing the Mac OS should be available for purchase this year. Apple has licensed the Mac OS to a number of computer manufacturers who now can make Macintosh-compatible computers. Previously, only Apple made computers to run the Mac OS.

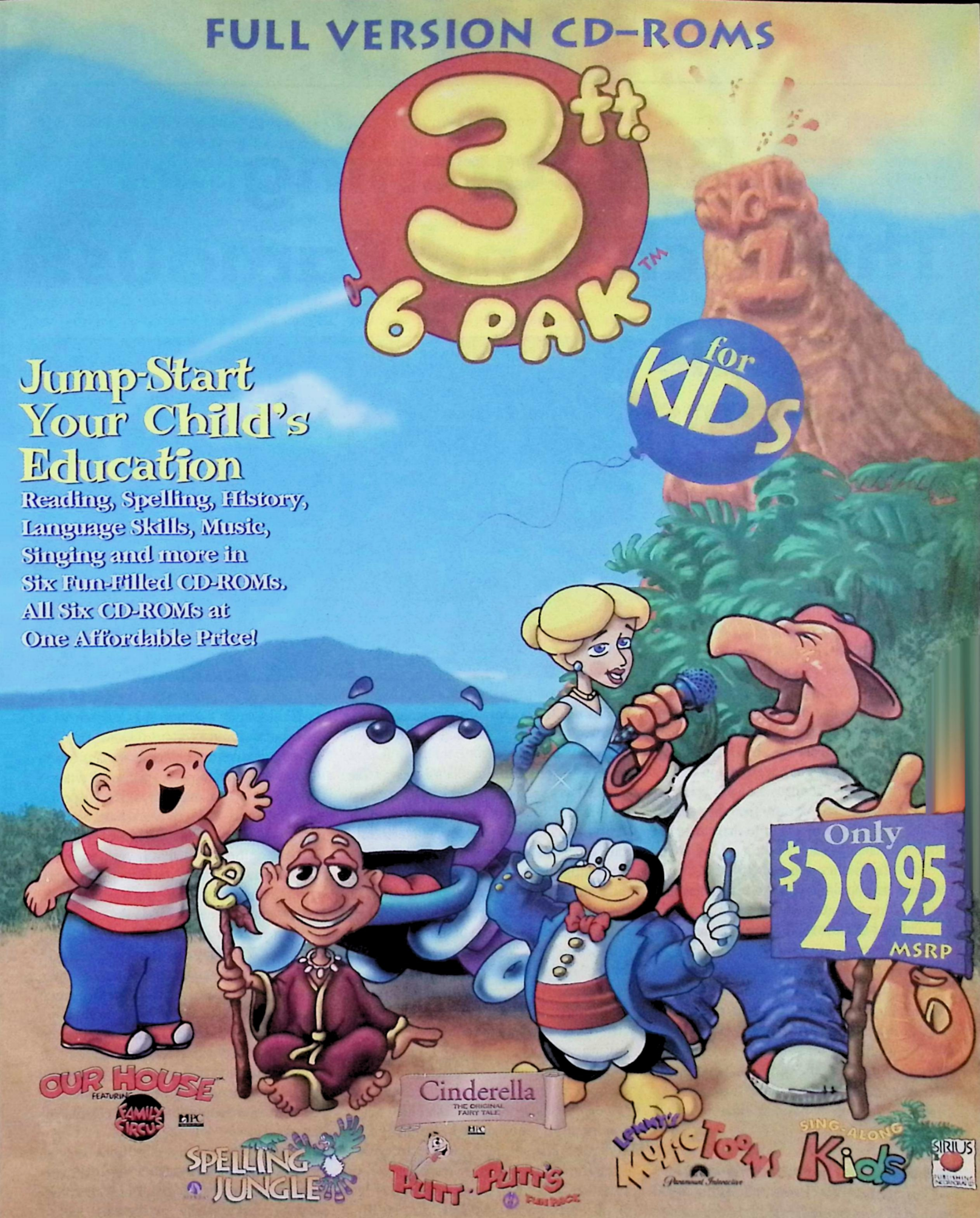
Choosing An OS

A number of exciting changes have occurred and will be occurring in the world of operating systems—the first of such major changes in many years. New operating systems aren't always the perfect solution for your computing headaches, though. Initially, they will have some bugs. Software upgrades that take advantage of the new operating systems are expensive and you may need some costly hardware upgrades to use the new operating systems, also learning a new operating system can be a daunting task.

If you're consistently finding yourself noticing your current operating system (because of error messages), it may be time to upgrade. With operating systems, the more anonymous they are, the better. ●

by Kyle Schurman

FULL VERSION CD-ROMS

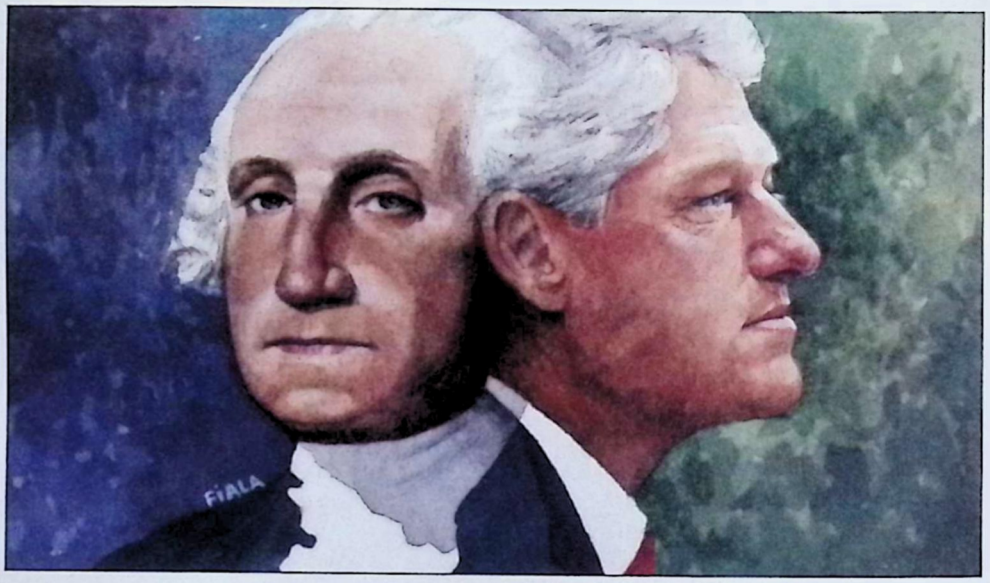


Hanging At Software Stores Everywhere Or Phone 1-800-247-0307

Sirius Publishing, Inc., 7320 E. Butherus Dr, Suite 100, Scottsdale, Arizona 85260, Phone (602) 951-3288, Fax (602) 951-3884.

Researching The Rich And Famous:

People Programs On CD-ROM



A couple of years ago, multimedia encyclopedias were the first programs to take advantage of CD-ROM technology. The creators put huge amounts of reference information normally found in volumes of encyclopedias on one disc. Then they added video, animation, and sound to make that information come to life.

Now that multimedia and CD-ROMs have become so popular, software companies are again taking advantage of the large storage capabilities of CD-ROM and turning out encyclopedia-like programs on a variety of topics. There are programs telling you everything you ever wanted to know about airplanes, skiing, whales, ancient times, art, rock 'n' roll bands, and the list goes on.

Here we narrow the scope and review some "people" programs that give you everything you ever wanted to know about famous folks, along with a little audio and video to make them come to life.

Leonardo The Inventor

Leonardo da Vinci was one of the most famous jacks-of-all-trades. He was not only a famous painter, but an artist, musician, scientist, architect, mathematician, engineer, inventor, and philosopher.

Future Vision Multimedia's *Leonardo The Inventor* takes you on a multimedia exploration of the model Renaissance man. Through either Microsoft Windows or the Apple Macintosh, you can learn about his drawings and inventions—from the tank to the helicopter to the voila organista—which were all written in backwards handwriting for secrecy. You can also get a glimpse of some of his most famous works, like the "Mona Lisa," "The Last Supper," or the "Adoration of the Magi."

Leonardo The Inventor is divided into six sections. An introduction acquaints users with Leonardo and the program. An "Inventions" section gives you a brief look at his inventions and drawings. A "Biography" briefly tells about Leonardo's history and his works. A "TimeLine" takes you through important happenings in Leonardo's life and important world events of the times. A "Works" section gives you the names, dates, and locations for all of his completed paintings and drawings. Finally, a "Bibliography" section lists references to other books about Leonardo.

Upon discovering Leonardo's plans for inventions such as a pedal-powered wing, a diving suit, or walking buoys that let people walk on water, you can see what Leonardo had to say about the subject, or watch a video illustrating how or if his invention exists today. Some inventions are also accompanied by three-dimensional illustrations that show how certain elements would work.

When you're ready for a rest from learning, Leonardo The Inventor comes with three rather simplistic games that let you slip into his diving suit, soar over Italy in a flying machine, and plot an escape from his fortress.

Although Leonardo The Inventor has an attractive interface with on-screen push buttons to make maneuvering through the program easy, it's questionable whether this would be a program Leonardo would have created for himself.

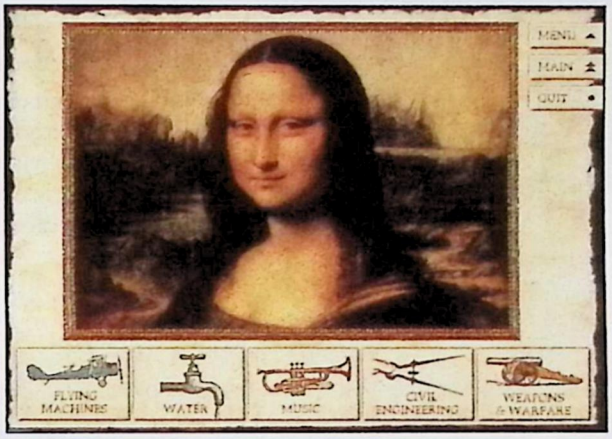
First, the program falls short from being an absolute guide to Leonardo da Vinci. The program includes only a handful of his most famous artworks, which, by the way, looked

pretty fuzzy. Also, the biography leaves something to be desired. It gives a brief description of Leonardo's life and works, but gives little insight into how he became such a famous inventor and thinker.

The inventions were probably the most interesting part of the program, but the explanations behind each invention are not in text. You must listen to an explanation given by a narrator, which can be a real bummer if you are working on a school report. We didn't find the games to be very challenging, and we had to strain to see more than one dimension in the three-dimensional illustrations (while wearing our 3-D glasses).

All in all, Leonardo The Inventor is an attractive program that has some useful information about the Renaissance man, but falls short of being a real "journey through the vast collection of his notebooks" as the program claims.

Leonardo The Inventor
Future Vision Mutlimedia
(800) 472-8777 or (914) 426-0400
Street Price: $30



***Leonardo The Inventor* is a multimedia exploration into the inventions of the great Renaissance thinker, Leonardo da Vinci, and his legacy to the modern world.**

U.S. Presidents

Maybe your eye is set on the White House and the Oval Office. We found four companies offering encyclopedia-like programs to immerse you in the pomp and circumstance of the nation's highest office.

The Presidents, A Picture History of Our Nation, by the National Geographic Society, is a DOS-based program detailing the lives of 41 presidents from George Washington to George Bush.

Articles tell about each man's life before, during, and after his presidency, including information about what kind of person he was, and others' impressions of him. Numerous photos detail the presidents' childhoods, places they lived, the First Ladies, and other family members. Several videos let you see and hear important events or presidential addresses, and audio clips provide portions of memorable presidential speeches.

A timeline highlights social, cultural, political, and world events, with links to maps, pictures, and fact-filled articles, to explain what was happening in the world during each president's term. In addition, a quiz game asks questions based on material in the program that you must answer correctly in order to unveil a presidential picture.

The thing that sets The Presidents apart from the other programs we reviewed is that it discusses the U.S. presidential process. There's information about all the political parties—Democrat to Federalist to Whig—including the parties' beginnings, beliefs, and presidents who ran on each ticket. Photo essays explain how presidents are elected, their power, and who they work with. Maps illustrate the electoral college, presidential birthplaces, and the growth of the United States.

But the program does have its shortcomings. It doesn't include any information on the 42nd president, Bill Clinton. When you take a closer look at the biographies, you find that they relate detailed information about the man and the course of his presidency, but few facts about his career. For example, the article on George Washington gives all sorts of information about what kind of man he was, but doesn't go into his military career as much as other programs. In addition, there's little information on the First Ladies and there's no search feature if you want to look for articles containing a particular name or phrase.

The thing that sets *The Presidents* apart from the other programs we reviewed is that it discusses the U.S. presidential process.

The Presidents, A Picture History of Our Nation
National Geographic Society
(800) 368-2728 (U.S.) or (800) 268-2948 (Canada)
Street Price: around $60

For preparing detailed school reports, *U.S. Presidents* by Quanta Press Inc. gives you statistics and facts on all 42 presidents, including President Clinton. There are facts about each president's childhood, career, presidency, retirement, and even a little about each First Lady.

You'll find a biography and a picture of every president, as well as each one's birthplace, ancestry, religion, children, and the full text of each inaugural address. The Clinton information is the most complete, with biographi for Vice President Gore and the Fi Lady, as well as information on each Clinton's cabinet members.

The program is set up for research and report writing. Search features let you search for specific titles or for ideas within the articles. A "Workspace" window lets you arrange article windows, pictures, and tables that can open on-screen. A built-in dictionary lets you look up unfamiliar terms.

While U.S. Presidents may be on CD-ROM, it lacks multimedia features. There are no videos and little sound. In addition, the few pictures it does have are larger than the screen and, irritatingly, can't be reduced to fit.

U.S. Presidents
Quanta Press
(612) 379-3956
Street Price: $40

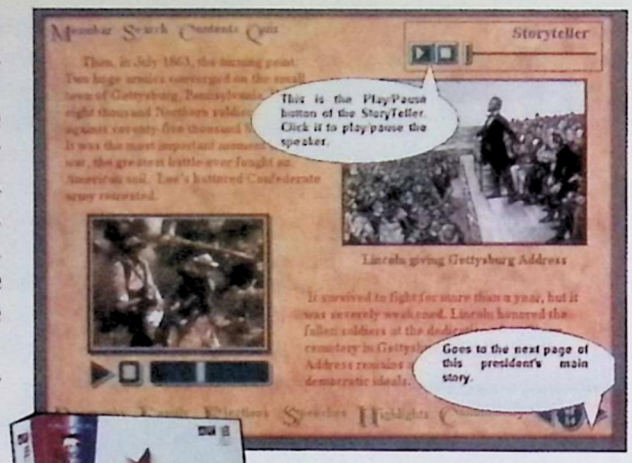
Great Bear's *Portraits of American Presidents* takes you on a multimedia exploration into the lives of the 42 U.S. Presidents.

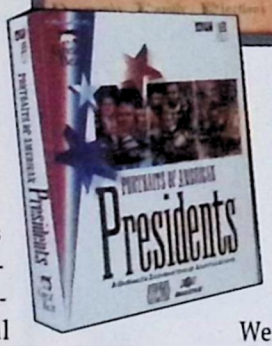
Before you begin, a narrated introduction takes you through a photographic essay of the history of our nation prior to the first presidential election. It sets the stage for the rest of the program, discussing the state

of the people, the former government, the revolutionary war, and the creation of the constitution.

At the heart of the program are three sections: "The Presidents of a New Nation" (Washington through John Quincy Adams), "The Presidents of a National Struggle" (Andrew Jackson through William McKinley), and "The Presidents of a World Power" (Theodore Roosevelt through Bill Clinton).

Each section contains numerous articles on the life and times of the presidents. "Biographies" apprise the history and career of each president. "Family" articles provide some information about the First Ladies and their children. "Election" articles relate results and statistics, as well as short stories about why each president was nominated, his campaign, and his opponents. "Speech" articles include the complete text of numerous presidential addresses, some of which can be heard through audio clips. "Highlight" articles point out important decisions and events that occurred during each president's term. Finally, "Commentary" articles give insight into what people really thought about the president's conduct, leadership abilities, foreign affairs, and his legacy to the office.





Portraits of American Presidents lets you discover the 42 U.S. Presidents with pictures, sound, and video that bring these men to life.

Photographs fill Portraits of American Presidents. Almost every screen includes one or two photographs. There's also several somewhat choppy videos of speeches, oaths of office, news clips, and current events.

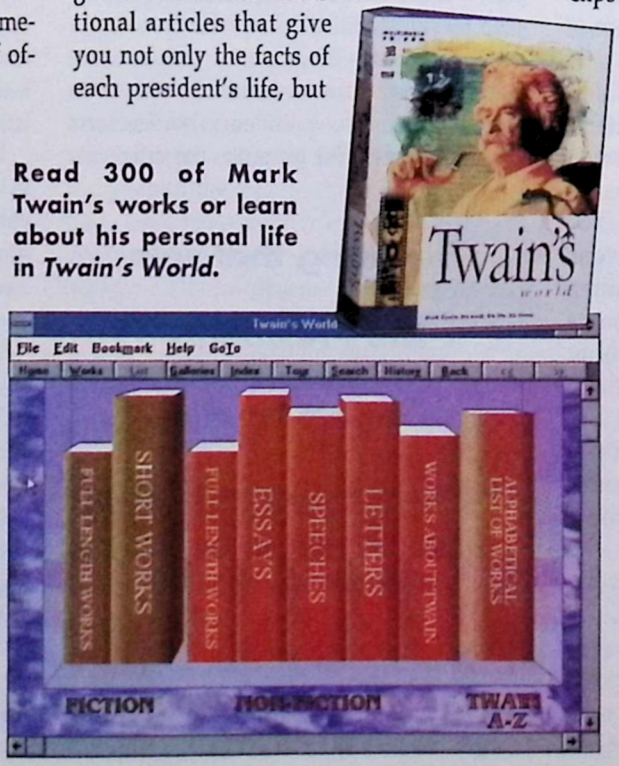
The search features in this program outshine the other presidential programs, and let you look through the whole program or just video and audio clips to search for a word, a combination of words, this or that word, or this word but not that word.

The program's "Timeline" section includes links to maps, presidential articles, decisions that shaped America, and more information you won't find in the rest of the program. A "Trivia Quiz" feature tests you by asking 10 questions based on the information you just learned. The questions are pretty difficult if you haven't done your homework.

A short, narrated conclusion wraps up what the presidency as a symbol means to America and how the contributions made by former presidents affects the way Americans see the country now.

We found Portraits of American Presidents one of the most complete presidential programs with lots of articles, photographs, and a few videos. If you're interested in First Ladies, this program includes the most information on them.

Upon taking a closer look at the biographies, we found the information to be not as detailed as the other biographies and the writing somewhat choppy. However, the program does include additional articles that give you not only the facts of each president's life, but also how he presided and affected the world around him.



Read 300 of Mark Twain's works or learn about his personal life in *Twain's World*.

Portraits of American Presidents
Great Bear Technology
(800) 795-4325 or (510) 631-1600
Street Price: $40

While the previous programs give you text-based chronicles of the lives of the 42 presidents, Time Warner Interactive presents a visual account of the 42nd president and his race for office in *Clinton: Portrait of Victory*.

The CD-ROM program is available in DOS and Macintosh versions, and is made up of nearly 300 photographs taken by *Time* magazine photojournalist P.F. Bentley as he followed Clinton from the primaries to his victory on Election Day 1992.

Clinton: Portrait of Victory is divided into three sections: "The Assignment," "The Candidate," and "The Campaign." "The Assignment" introduces the program and tells how Bentley got the assignment, why he decided to make the photographs black and white, and what he learned from the experience.

"The Candidate" covers the events in Clinton's life up until the election and how he overcame crisis during the campaign. A few color photographs are accompanied by audio clips from some of Clinton's speeches.

Finally, "The Campaign" contains narrated photo essays of the campaign, with "photo albums" of the 300 pictures detailing the campaign, the convention, traveling on the road, the debates, and the big finale. A timeline of milestones details events from the time Clinton decided to run until his victory speech at the Little Rock Old Courthouse in November 1992.

The program is mixed with text, some sound, and a few speeches. Following the old saying that a picture is worth a thousand words, the program is mostly a compilation of story-telling photographs. Although the program is not the same kind of historical reference as the rest of the programs may be, Clinton: Portrait of Victory is worth a look for real insight into the 42nd president's journey to the White House.

Clinton: Portrait of Victory
Time Warner Interactive
(800) 482-3766 or (818) 295-6600
Street Price: $30

Twain's World

Samuel Langhorne Clemens was one of the best pen handlers ever born. Writing under the pen name Mark Twain, he wrote such memorable works as "The Adventures of Huckleberry Finn," "Pudd'nhead Wilson," and "The Prince and the Pauper." Now the Bureau of Electronic Publishing offers a comprehensive picture of Twain's works and his personal life in *Twain's World*.

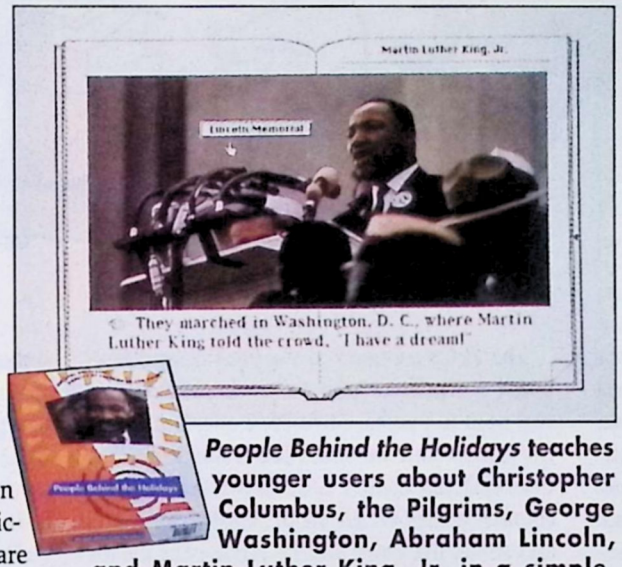
Twain's World contains a library of more than 300 of Twain's works in their full text. You can read through the electronic pages of Twain's most famous adventures like "The Adventures of Tom Sawyer" and "The Notorious Jumping Frog of Calaveras County," as well as his essays, speeches, and letters. The program also includes several interactive multiple choice questions to test your reading comprehension of every work.

But Twain's World offers more than Twain's writing. For a comprehensive picture of the man, almost a dozen works are grouped together to offer a biographical history, relate anecdotes about Twain, or comment on his work. A "Timeline" section pinpoints the major events in Twain's life, beginning with his birth in 1835 and highlighting important milestones and works until his death in 1910. When you click on icons in this section, the program brings up a paragraph explaining the event, and you can click another button that links you to related articles or illustrations.

All pictures, illustrations, videos, animations, and narrative audio clips taken from Twain's works or articles about him are included in a multimedia "Gallery" section. The program boasts a never-before-released video of Twain supposedly taken by Thomas Edison in 1909.

We thought the program was a good reference on Mark Twain, but you should buy it for the stories and the biography rather than the pictures and videos. We were less than impressed with the array of illustrations and animations within the program. When compared to animations and illustrations within other popular multimedia programs, the animations are simple and add little understanding to the stories or to the whole program. Perhaps the space on the CD-ROM would have been better used to improve the "Timeline," which is simply made up of a group of icons, leaving you clueless as to the events included unless you click on each of the icons.

But while the program may not wow you with its multimedia capabilities, it is one of the most complete references on Mark Twain. It's a collection of old favorites, as well as previously unpublished and hard-to-find works.



***People Behind the Holidays* teaches younger users about Christopher Columbus, the Pilgrims, George Washington, Abraham Lincoln, and Martin Luther King, Jr. in a simple, book-like interface.**

The Search feature is another bonus. You can look through all of Twain's works to see what he had to say about a particular topic. You can look for a word or phrase, or for articles with one word but not another word. You can even narrow the search process by telling the program to search through just the articles or only the multimedia clips.

Twain's World
Bureau of Electronic Publishing
(201) 808-2700
Street Price: $30

People Behind The Holidays

President's Day. Martin Luther King Day. Thanksgiving. Ever wonder why we have these holidays? National Geographic Society's *People Behind The Holidays* gives young computer users the answers about the people who inspired these occasions.

People Behind The Holidays is simply five children's books placed on CD-ROM for Microsoft Windows and Macintosh systems. These books include: "Who Was Abraham Lincoln," "Who Was Christopher Columbus," "Who Was George Washington," "Who Was Martin Luther King, Jr.," and "Who Were the Pilgrims."

You can have a narrator read a book to you or you can read the book yourself. In simple language, the stories provide biographical information and explain why these people are so important to American history. As you read through the book, you can place Bookmarks in places you want to refer back to, and a Recall list reminds you of all the terms and phrases you looked up during your session. The books also contain numerous pictures and illustrations that are somewhat interactive. The images don't move, but if you click on an object, the narrator will tell you what you are looking at.

If you're an adult or an older student looking for facts and dates, these programs may not be for you as the books in People Behind The Holidays are written for a very young audience. For example, an excerpt from "Who Was Abraham Lincoln" says, "I wrote an important paper called The Emancipatic Proclamation. It said that slaves in th South were free."

The information is not as detailed as the other programs we reviewed, but it can be a good early learning tool to introduce children to these topics. In fact, Activity Guides feature extensive background information (with all sorts of facts, dates, and figures for grown-ups), follow-up activities, and vocabulary terms for each book.

People Behind The Holidays
National Geographic Society
(800) 368-2728 (U.S.) or
(800) 268-2948 (Canada)
Street Price: $70

Keep An Eye Out

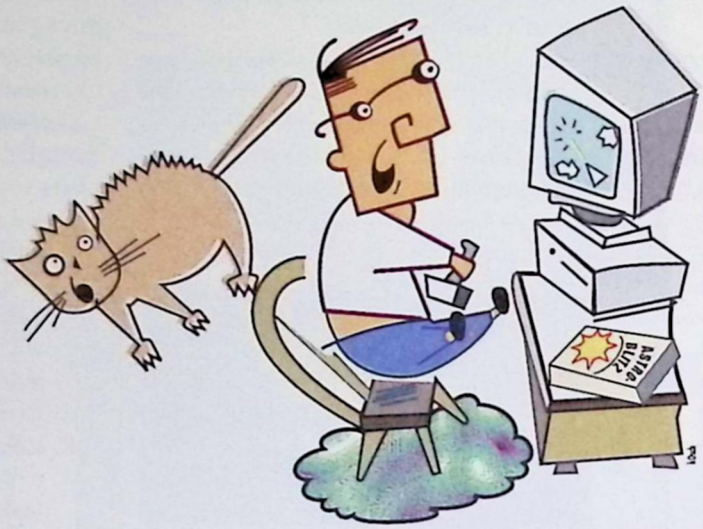
So that's all she wrote—or pretty close anyway. The selection is somewhat limited, we are sorry to say. Programs fully devoted to people like Martin Luther King, Jr. or Betty Friedan have yet to hit the marketplace. But keep your eye out. Chances are that as CD-ROM and multimedia become more popular, we will see programs on these people and people we've yet to hear of as well. ●

by Cindy Krushenisky

Making The Joystick Pick

The radar lights up and the pilot's senses are tingling. The G-forces push him into the seat as he presses four times on the down arrow key. He jams his index finger on the plus key to push his engines to full power. With the bogie in his sights, he hits the spacebar and turns the bad guy into scrap metal.

This probably isn't the kind of play-by-play that fills the daydreams of computer gamers. Tom Cruise wanna-bes don't picture themselves rushing into the fray with their fingers clutching a keyboard. It's no great insight to say that players wanting to reach maximum realism in flight simulators reach for a joystick. But the issue is open to more debate when it comes to picking a particular input device. There are questions of how much functionality is enough, how important ergonomics are, and, perhaps most importantly, how much gamers can expect to spend.



As with other products, the answers to these questions influence each other. Only serious gamers willing to invest $150 or more can expect the most features, realism, and comfort in a joystick. Lower-end joysticks won't offer the same smooth action or feature flexibility as their more expensive brethren. But a gamer who only uses the stick once a week can probably live with these limitations in exchange for a $35 price tag. In this article, we'll present a sampling of the joystick market and provide a look at what's available throughout the price/feature spectrum.

F-16 FLCS

At the top of the feature and price pyramid is Thrustmaster's F-16 FLCS. This stick is loaded with so many switches and buttons and has such a Top Gun aura that it's fun to play with even before the computer comes on. The FLCS design is based on the grip found in the F-16 Fighting Falcon. It features four eight-way switches, four buttons, and a two-stage weapons trigger. For joystick neophytes who are wondering, the four-way switches are round buttons that are pressed to the sides rather than in.

The FLCS connects to the joystick and keyboard ports. Users with six-pin keyboard ports will need to purchase two PS/2 adapters before the FLCS can be installed. The included *Command and Control Center* software contains command files for all major flight simulations and games like *Doom* and *Tie Fighter*. The file for a particular program is downloaded to the stick's memory chips with a Download/Run switch on the unit. The stick's memory is **non-volatile**, meaning the last file downloaded will remain in memory even when the computer is turned off.

Once the virtual flight begins, the FLCS impresses with more than just looks. There is smooth motion throughout the joystick's range. While some sticks give a feeling of four corners and a center area in their motion, the FLCS is continuous in all areas.

This stick puts more controls at the player's fingertips than any other product we saw. Keyboard functions are automatically assigned to the various controls when a command file is downloaded. Ambitious users can program the buttons to carry out the commands of their choice. Other sticks like the CH Products Flightstick Pro and Advanced Gravis' Phoenix Flight & Weapons Control System provide keyboard function buttons, but the Flightstick has just three buttons and a hat switch. The Phoenix system puts its buttons on the deck of the unit, forcing users to either look down to find the right button or fumble for the right one. The FLCS keeps the features on the stick itself where they can be accessed by touch.

A palm rest at the base of the joystick makes the FLCS comfortable during extended use. The only problem is with the pinky button at the bottom front of the stick. The player's pinky must be held out a bit to keep from hitting the button, causing some fatigue during extended play. Left-handed users will struggle with the FLCS because of the hat switch on the left side of the shaft.

Though this unit is highly functional and authentic, it's a very specialized joystick. Serious flight simulation players, especially combat simulation players, will love it. They're also likely to be the only ones willing to pay the expected street price of around $150. Casual gamers who play a variety of computer games may consider the FLCS input overkill.

F-16 FLCS
Expected Street Price: $149.95
ThrustMaster
10150 S.W. Nimbus Ave.
Portland, OR 97223-4337
(503) 639-3200

Flightstick Pro

The Flightstick Pro is another high-quality joystick that will seem practical to many users. The stick has an excellent feel, complete with a palm support at the base and a finger rest under the trigger. It offers the finger trigger, a four-way switch, three function buttons, and dials to control throttle and trim. Like the FLCS, the Flightstick Pro has an ultra-smooth feel throughout its range.

The amount of control via the buttons falls at a happy medium. There aren't so many buttons that it confuses the average player, but there's enough on-stick control to eliminate a lot of hunting and pecking on the keyboard. Even beginners can quickly familiarize themselves with the buttons, which are presented on the broad back face of the joystick top. It won't take long to find yourself switching views, changing weapons, and targeting enemies without even thinking where your fingers are going.

Big-time realism and full programmability mark Thrustmaster's F-16 FLCS.

The Flightstick Pro is the hands-down favorite among the die-hard gamers around our *PC Novice* offices. A frequent comment was that the stick made them immediately better at a game and gave them more control. The easy response of the Flightstick Pro minimizes violent jerking of the stick to control a game. Many of the joysticks in our test drew attention from passing gamers because of their novelty. When it's time to play, the users we know usually grab a Flightstick Pro.

The CH stable also includes the Jetstick, a lower-end controller. The two-button unit includes dials for aileron and trim control and a smaller palm support at the stick's base. As this issue went to press, CH's Flightstick Pro for the 3DO game platform was about to hit store shelves.

Flightstick Pro
Expected Street Price: $79.95
Jetstick
Expected Street Price: $20
CH Products
970 Park Center Drive
Vista, CA 92083
(619) 598-2518

Wingman Extreme

The most comfortable stick of the bunch comes from Logitech, a company best known for its mice and trackballs. The pointing device power has launched itself into the joystick dogfight with the uniquely styled Wingman and Wingman Extreme. We tested the Wingman Extreme, which offers three buttons, a four-way switch, finger trigger, and trim controls on the base. Wingman has a thumb button and finger trigger. Both sticks feature extra-heavy bases that let them stand firm against the hands of intense gamers.

Wingman Extreme's shaft design offers a ledge to support the palm; the front side of the shaft is contoured for the fingers, and a wing on the left side supports the thumb. (Left-handed players will have trouble using this stick also.) If you relax your hand while resting it on its outer edge, you'll see the hand position the Wingman Extreme allows. The feeling is completely natural, and gives the sensation of moving your hand to control a game rather than moving a stick.

Wingman Extreme's motion is smooth during play and the well-placed buttons provide tactile and audio feedback.

Wingman
Expected Street Price: $29 to $39
Wingman Extreme
Expected Street Price: $49 to $59
Logitech
6505 Kaiser Drive
Fremont, CA 94555
(510) 795-8500

Phoenix Flight & Weapons Control System

Gimmicky or innovative? That was our main question as we pulled the uniquely designed Phoenix Flight & Weapons Control System from its black, angular box. We wondered how this bulky plastic deck covered with buttons and a pointed joystick compared to more traditional joystick/weapons control setups. In the end, we found the Phoenix system a bit more innovative than practical.

The unit places the joystick at the right side of the plastic deck with six buttons and two triggers located on the stick. At the far left of the unit is an arm with eight buttons, a sliding throttle control, and a twisting rudder control. Eight more buttons line up across the span between the stick base and throttle arm. When one of the buttons is set for a shift function, the system's abilities double. The Phoenix system plugs into the joystick and keyboard ports since it places keyboard commands in the buttons.

The Phoenix system's software presents a graphical interface in which users select command files for popular games or program the buttons to their preferences. The Gravis soft-

Flightstick Pro is frequently the preferred choice for die-hard gamers.

ware did the best job of showing players the functions of various buttons. Users simply point to a button on the photo of the Phoenix system, and a dialog box appears describing the keystrokes assigned to the buttons and what they do. The button functions can be printed for reference. Programming the buttons requires simply typing in the keystrokes. Hardware setup had a similarly impressive feature in the four tension controls on the base's bottom. Players adjust the stiffness or softness the stick in each direction, a boon to picky users.

Some of the buttons, including the heavily used group on top of the stick, have a soft, rubbery feel. Since many gamers prefer a solid click when they press a button, this may be considered a negative feature. The stick itself had smooth motion at the softest setting, but the sticktop buttons were a bit difficult to reach. As noted earlier, Phoenix's deck buttons are also a bit tough to locate without looking down.

While Thrustmaster's setup of separate joystick and weapons control units is a more comfortable choice, players seeking extensive keyboard functionality in a joystick unit at a mid-range price should check out the Phoenix, which costs $80 to $100 less than the Thrustmaster system.

One Advanced Gravis product with undisputed popularity is the PC Gamepad. This inexpensive controller is similar to the familiar Nintendo controllers, except the Gamepad offers four buttons for greater control. A joystick that stands about one inch tall can be screwed into the controller button. The unit has curved ends so that it fits snugly between the index fingers and thumbs of the user's hands; it can

Wingman Extreme's ergonomic design lets the player's hands forget about the stick and concentrate on the action.

be flipped upside down for right- or left-handed use. Two switches let players change button functions or orient the Gamepad for use with either hand. The pad offers the "one-click-at-a-time" control and buttons needed for many arcade games.

Phoenix Flight & Weapons Control System
Expected Street Price: $120
PC Gamepad
Expected Street Price: $17 to $21
Advanced Gravis Computer Technology Ltd.
101-3750 North Fraser Way
Burnaby, B.C., Canada V5J 5E9
(800) 663-8558

The Phoenix Flight & Weapons Control System provides functionality at a mid-range price.

FlightMAX

When we turn to Suncom's lineup, we address the needs of readers who have come this far saying, "Sure, that sounds great, but there's no way I'm putting down that kind of money for a *joystick*!" Suncom's price range will appeal to gamers who don't spend all day dreaming of the game they'll boot up when they get home.

The first grab of the FlightMAX makes it obvious that this stick doesn't have the ergonomic supports of the more expensive models. There are

No Yoke! There's Life Beyond

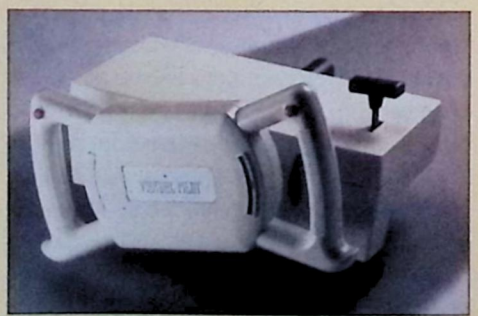
Does flying a simulated Cessna with a joystick seem a little goofy? Does that free hand keep coming up to grab the wheel during computerized auto races and find only the same stick? If you've experienced these problems, it may be time to consider a specialized input device. These aircraft yokes, steering wheels, and pedals boost realism with authentic controls. If the desktop starts to get crowded with joysticks, yokes, and gamepads, we even found a product to cure the cable-switching blues.

Virtual Pilot

CH Products has assembled a complete control package in the Virtual Pilot. The bow-tie-shaped yoke is mounted on a sliding column that moves in and out of a box that attaches to the edge of a desk. A throttle control lever sits atop the unit, and there are two dials to control elevator and trim control. A thumb button is located on each of the yoke grips.

Players know this is a new experience the first time they take the Virtual Pilot into the virtual air. The smooth slide and turn motions of the yoke take gamers one step closer to a real flight experience. Our only complaint with the Virtual Pilot was that, with only two buttons, there was limited control over features like landing gear, view switching, and weapons selection. CH was ahead of the problem and added four buttons and two four-way switches to the just-released Virtual Pilot Pro. The Virtual Pilots also serve well as steering wheels in auto racing games.

CH has another product that takes players one step closer to reality. Pro Pedals are rugged foot pedals that serve such dual functions as airplane rudder controls and auto brake and throttle controls. According to CH, these are the only pedals on the market with two motions to accommodate these functions. The entire pedals slide forward and backward for rudder control and pivot up and down for car games.



CH Products' Virtual Pilot (shown here) and Virtual Pilot Pro provide smooth, ultra-realistic flight control.

Virtual Pilot
Expected Street Price: $70 to $75
Virtual Pilot Pro
Expected Street Price: $89 to $100
Pro Pedals
Expected Street Price: $94 to $110

G-Force

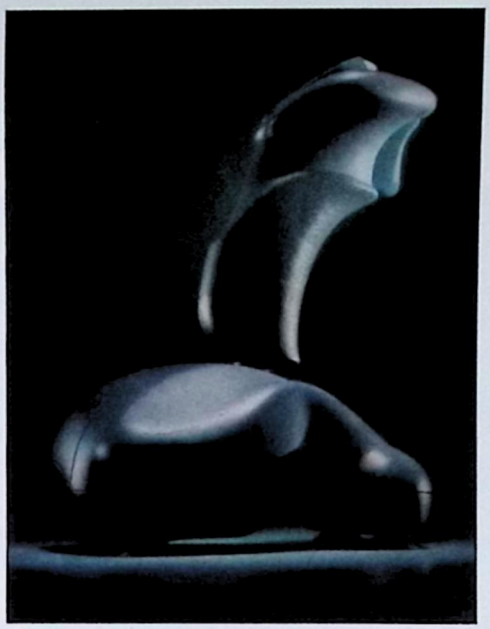
Suncom's G-Force yoke offers the mounting option of either attaching to the desk edge or staying on the desktop with suction cups. The U-shaped yoke provides a trigger and thumb button on each grip, sliding throttle control, and axis trimmers. The entire yoke column leans forward and backward for climbing and diving, and the column can be locked for driving games where turning is the only required function.

The G-Force was very comfortable to use, and it didn't take long to gain fine control over games with this yoke. The action is quite different from that of Virtual Pilot. The Virtual

no rests for the trigger finger or palm. It does lean slightly forward and is indented around the base for a better grip. The two buttons—one trigger and a thumb button atop the stick—yield a satisfying click when pressed. There are two throttle control sliders and two trim controls on the base. A switch under a plastic panel alternates functions between the trigger and thumb button.

The FlightMAX is considerably stiffer than the FLCS or Flightstick Pro. When held to one side and released, the latter two sticks snap to the center bouncing back and forth slightly. The FlightMAX snaps immediately to the center without budging. This isn't necessarily a negative, but should be pointed out so buyers know if the stick fits their preferences. The stiffer stick will work best in arcade games where the gentle rolling of flight SIMs isn't so welcome.

We did have trouble calibrating the FlightMAX properly. When we started a couple of games, we were stuck in a perpetual nosedive. The base's axis controls helped to offset the ugly spin a bit.



Strange looks aside, Suncom's FX2000 provides a comfortable grip and handy tricks like suction cups on the base.

At first glance, Suncom's FX2000 looks like it might have been left on a hot dashboard, but all the strange contours have a purpose. The joystick is curved to fit nicely in the palm and the thumb button is ridged so the thumb lands comfortably. The base has a large crease in the bottom and indentations on the sides so it can be easily gripped during handheld use. Suction cups let the FX2000 cling to the desktop during intense play. The stick can be lifted and turned in any direction to reorient the control for those who hold the unit at an angle.

FlightMAX
Expected Street Price: $39.99
FX 2000
Expected Street Price: $29.99
Suncom Technologies
6400 W. Gross Point Road
Niles, IL 60714
(708) 647-4040 ●

by Trevor Meers

Joysticks

Pilot yoke slides in and out, the G-Force tips forward and backward. The Pilot's throttle is a lever, the G-Force uses a slider. After playing with both yokes, we couldn't decide which we liked better.

G-Force
Expected Street Price: $69.99

Joyswitch

The desktop of a fully outfitted gamer can quickly become cluttered with joysticks, steering wheels, and game pads. Even worse is the tangle of cords behind the PC and the headache of crawling back there to swap the cables running into the joystick port. Lead Pursuit comes to the rescue with its Joyswitch, which lets users easily switch among multiple input devices. This device is so handy that we wonder why no one came up with it sooner.

The Joyswitch has outlets for four main joysticks and two foot controllers. Two heavy-duty switches on the front allow rapid selection of any combination of the input devices, including an "off" setting for the foot controller to avoid possible game conflicts. Lead Pursuit took the extra step of making a special outlet for Thrustmaster's Weapons Control System Mark II (WCS). WCS users route their keyboards through the controller, so if the WCS loses power, the keyboard doesn't work. Thus, Joyswitch's WCS outlet has constant power, even when another joystick is selected.

With Joyswitch, moving from joystick to yoke and foot pedals takes less than two seconds while the player turns two knobs. Controller-happy gamers won't want to go without it.

The locking column of Suncom's G-Force yoke allows it to do double duty in flight and driving games.

Joyswitch
Expected Street Price: $45 to $49
Lead Pursuit
27068 La Paz Road, #466
Laguna Niguel, CA 92656
(714) 362-8698

Thrustmaster Products

Auto racing gurus who won't settle for any yoke/wheel combination can take hold of Thrustmaster's Formula T1 driving assembly. The controls include a steering wheel attached to a console with a gearshift and two dashboard buttons, and a separate, floor-mounted platform with gas and brake pedals. Users will probably wonder how they ever got along with just a keyboard and joystick.

Flight fans can try Thrustmaster's rudder control system (RCS). The aluminum and heavy-gauge plastic pedal unit is specifically designed for aircraft simulations.

Formula T1
Expected Street Price: $130
RCS
Expected Street Price: $120 ●

So real, you may have to notify air traffic control.

You no longer have to imagine the experience. Because now you can live the dream.

Introducing G-FORCE, the high-tech flight yoke that lets you pitch, roll, bank, soar and never lose control.

Activate dual fire buttons, throttle control, and more!

So flexible, it even transforms into a fixed-column steering wheel for driving simulations.

Try G-FORCE by Suncom. It's like a heavy dose of reality.

Suncom
TECHNOLOGIES

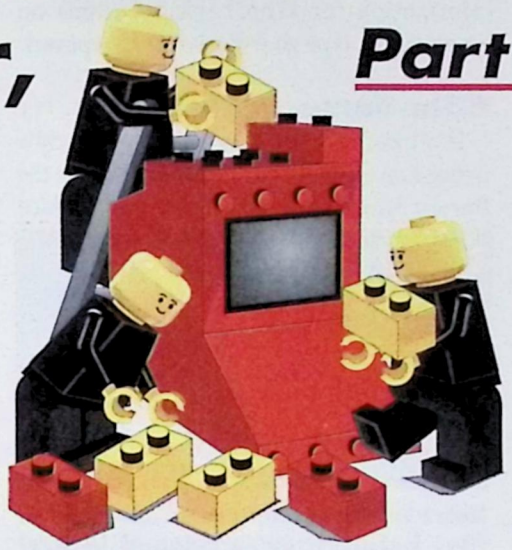
The Hardware Advantage for Entertainment Software

6400 W. Gross Point Rd., Niles, IL 60714 708/647-4040

FOR IBM & COMPATIBLE PCs.

Screen shot of World Circuit by Microprose!™

Building A Better Word Processor, Part II



There is an army of add-on products for Microsoft *Word For Windows* that isn't available for *WordPerfect*. Maybe it's because WordPerfect has, for the moment, superior file management tools. Or maybe it's because software programmers have seen the handwriting on the screen and decided that Word will become the dominant Windows word processor. Or maybe it's just easier to write software for Word than for WordPerfect. But the fact remains, anything Word can do, add-on utilities can do better.

This month, we'll review add-on programs that are designed exclusively for Word or for Windows, and discuss some of the shareware programs that can be found on CompuServe and America Online forums. (*NOTE: All prices listed in this article are the products' suggested retail price, not street price.*)

Add-ons For Word

For example, Alki Software Corp. makes its living supporting the DOS and Windows versions of Microsoft Word. *MasterWord* not only elegantly replaces the help file in Word, but comes with a set of 12 handy Wizards that quickly walk you through such arduous tasks as positioning page numbers, printing watermarks like "draft" or "confidential" across a page, taming headers and footers, and placing decorative borders around paragraphs. Unlike Word's built-in Wizards, MasterWord includes much- needed preview screens.

If you work with a lot of fonts, you'll appreciate the pop-up font menu that displays fonts in their actual faces, which saves you the trouble of going to a dialog box to make a choice. Pumped-up file management tools let you choose directories and recently used files from pop-up lists. You can give long names to directories, and see full details about a file including the name, date, size, and summary information of any document *before* you open it. A File New command also supplies valuable details about templates.

Another timesaving feature is the ability to run other programs from within Word using the Program Options feature from Master-Word's Easy Menu. Instead of task-switching in and out of Word, you can launch your favorite DOS and Windows programs without ever leaving Word.

A pop-up spell checker checks a word with a mouse click or a CTRL key. While this feature uses Word's normal spelling dictionary, Alki sells enhancements to the spell checker and thesaurus. Its *Comprehensive Thesaurus* triples Word's synonyms and includes a pop-up thesaurus while *Comprehensive Spelling* adds over 80,000 medical, legal, and business terms to Word's speller.

But these extra utilities pale in comparison to MasterWord's primary function: providing first-rate online help for Word. MasterWord's Command Center can find commands even when you don't know their names. Simply select a task category, such as Menus or Toolbars, then choose from one or more subcategories. Within seconds you can narrow down hundreds of commands to several choices. From there you can run any command or get details on how to use it. If the command has a corresponding icon—like boldfacing or inserting a page number—you can paste it directly onto the toolbar. Help can be tailored to different levels, including beginner, intermediate, advanced, and children. Versions for Microsoft Word for DOS 5.0 and 5.5 are also available for $59.95 each.

Similar to Design Portfolio (see "Building a Better Word Processor, Part I" in the January 1995 *PC Novice*), but available only for Word For Windows, Alki's *DocStudio* is a template generator for people who want to create professionally designed documents without going to art school. Using powerful Wizards like those found in MasterWord, DocStudio can quickly mix and match document types with design families. Document types include letters, memos, reports, manuals, fax sheets, flyers, and certificates. Nineteen design families and their accompanying 35 Bitstream fonts range from antique to modern, casual to corporate, and hi-tech to retro. Like ordering from a Chinese menu, you can create 190 designs by selecting one from column A and matching it with another from column B. Documents can be fine-tuned using options from a drop-down menu. DocStudio is flexible enough to let you create your own designs, but enough of a design critic to police your work—weak combinations have been removed from the program. DocStudio is perfect for creating new documents, applying a dash of new design to existing ones, or creating customized templates to be saved as Word stylesheets.

MasterWord Windows, $59.95
MasterWord DOS, $59.95
Comprehensive Spelling, $69.95
Comprehensive Thesaurus, $39.95
DocStudio, $69.95
Alki Software Corp.
(800) NOW-WORD
(206) 286-2600

While not as powerful, but a whole lot cheaper, you can't beat author Daniel Will-Harris's *Word for Windows Designer Disk*, which includes professionally designed templates of the most commonly used document types, including fax forms, letterhead, reports, covers, six different styles of resumes, advertisements, memos, contracts, price lists, proposals, invoices, signs, and press releases. Will-Harris not only does all the programming for you, but makes the manual funny and interesting.

Word For Windows Designer Disk, $39.95
Daniel Will-Harris
P.O. Box 1235
Point Reyes, CA 94956-1235
CIS: 73257,2606

Perfect Companions

Realizing that the majority of add-on products favor their competitor, WordPerfect has recently put the word out to shareware programmers that they are looking for and will support add-on utilities for its flagship word processor. In the meantime, the company has launched *WordPerfect Main Street*, a collection of more than 20 software titles, including *InfoCentral*, a personal information manager; *WordPerfect Works For Windows*, an integrated suite of tools, including word processing, drawing, painting, database, and communications; and *WordPerfect ExpressFax+*, a fax and data communications product that allows users to send and receive faxes and connect with information services and electronic bulletin boards.

For more information about WordPerfect Main Street or any WordPerfect product, you can also call the company's bulletin board system. If you have a modem, call (801) 225-4444 and follow the on-screen instructions.

InfoCentral, $139
WordPerfect Works For Windows, $109
WordPerfect ExpressFax+, $49.95
WordPerfect Corp.
(800) 451-5151
(801) 225-5000

Tracking Down Shareware

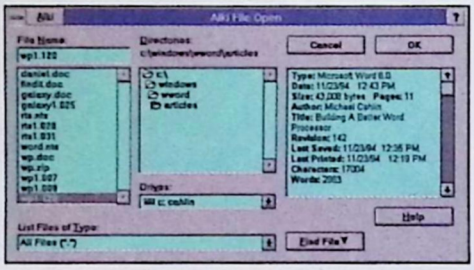
Not all word processor adds-ons are expensive. As a matter of fact, the three most powerful and versatile add-ons for Microsoft Word —*WOPR*, *Prime*, and *MegaWord*—cost less than $50 and you can find plenty of other powerful products to punch up either Word or WordPerfect for less than half that!

The best places to find shareware products are on bulletin board systems. WordPerfect and Microsoft maintain their own forums on CompuServe that contain special libraries of products, patches, fixes, and macros for their DOS and Windows word processors. Many are free while others require a minimum shareware registration fee ranging in price from $5 to $40. By exploring these forums and other libraries of shareware products, you'll discover a universe of inexpensive add-ons guaranteed to make your favorite word processor more productive.

The following shareware products are located on Microsoft's Word Forum on CompuServe (type **go msword**). To locate utilities and information for WordPerfect Forums on CompuServe, type **go wpforum** or **go wpusers**.

The Fantastic Three

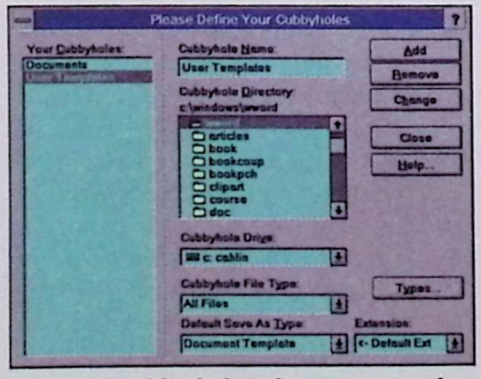
If all WOPR (which stands for Woody's Office Power Pack and is pronounced like the Burger King hamburger) did was replace



Users can see summary information of files before they're opened in Alki Software Corp.'s *MasterWord*.

Microsoft's file manager it would be worth more than its $49.95 price tag. Hooking onto the File Menu, the WOPR File Manager includes Copy, Delete, Remove, Make Directories, and all the features you'd expect in a standalone file manager. What's also ingenious is its ability to set up "cubby holes" for your most-used directories. Let's say you keep a DOC directory on your C: drive but your BILLS directory on your D: drive. You can set this up and access and save files to each directory with one mouse click instead of an orchestration of keys.

Other nifty features include the ability to modify headers and footers. Unlike Word's clumsy View Headers command, which is keyboard and mouse-click intensive, WOPR's



***WOPR*'s "cubby holes" let you access frequently used files with a click of a mouse instead of long path statements.**

toolbar inserts page numbers, date, time, and more, with a single mouse-click.

WOPR's envelope addresser puts Word's to shame and rivals standalone products like *DAZzle*. A versatile paper-saving feature allows you to quickly proof longer documents with several handy multi-page printing features, including two-up, four-up, and tri-fold pamphlets, greeting cards, and thumbnail and booklet printing.

While Word ships with 50 built-in Toolbar buttons, there is no way to manage the buttons. WOPR's Toolbar button editor offers a suite of button management tools and a selection of 500 buttons.

WOPR also includes an address book, the ability to browse through graphics files before you open them, and the ability to use your right mouse button to blast through spell checks.

WOPR, $49.95 plus $4.50 shipping & handling
Pinecliffe International
(800) 788-0787
(314) 965-5630
CIS: 76711,1171 (or GO WOPR)

MegaWord, like MasterWord and WOPR, bundles a bunch of comprehensive add-ons for Word. Fast Open lets you see a document before you open, print, delete, rename, copy, or move it. Document Recall remembers which files you've been working on and previews or reloads them. Like MasterWord, MegaWord comes with a bunch of powerful system tools to manage other Windows applications from within Word. The Application Manager starts any program and adds it to a point-and-shoot Button Bar or Launch Menu. The Main Applications Tools and Control Panel Toolbar instantly accesses frequently used Windows programs. Other tools are available for editing and formatting, viewing, and managing templates. If that's not enough, a BioRhythm program reveals physical, emotional, and intellectual characteristics on a daily basis, while a CD Player feature controls your CD-ROM from the Word toolbar so you can listen to music while you work.

MegaWord, $49 plus $5 shipping & handling
Merlot International
(800) 788-0787
(314) 965-5630
CIS: 76711,1171

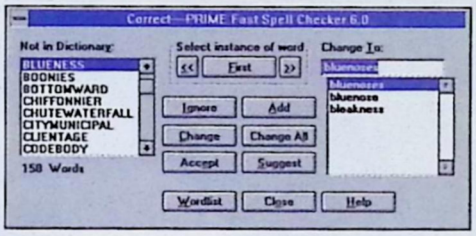
Prime's spell checker is not only lightning fast, but it's the only one that creates a list of misspelled words so you can revise all errors at once. This dandy piece of shareware also includes 11 other helpful features. FileNew provides long, descriptive template names, plus a handy template preview feature. And Zoomer zooms a document into any increment with a 3-D control and custom settings. The product also ships with a list of Word bugs and solutions.

Prime, $39.95 plus $4.50 shipping & handling
Advanced Support Group
(800) 788-0787
(314) 966-1833
CIS: 76711,1171

For sheer shareware value, check out software from Andrew M. Freeman. His AMF Shareware Productions offers a medley of inexpensive add-ons for Word For Windows. For $5, there's a powerful business card template designed for use with #10 business card stock for laser printers. For $15, *Wordware Personal Information Manager* stores over 10,000 entries in a virtual rolodex. You can dial the phone, add an address or insert contact information into letters, create an envelope, and much more. His *Wordware for Word 6.0 for Windows* rivals products like MegaWord and WOPR for the hottest collection of macros, templates, and whiz-bang features.

Wordware Personal Information Manager, $15
Wordware for Word 6.0 for Windows, $39.95
AMF Shareware Productions
P.O. Box 189
Holbrook, NY 11741
CIS: 74250,1700

From Total System Solutions, there's *Fileware* and *DocuPower Pro*. Fileware's suite of 19 tools lets you delete, rename, move, and copy files, as well as create and remove directories—all from within Word. Other features include a



***Prime* lists all of the misspelled words in a document so users can make corrections in one brief sweep.**

custom color toolbar and a handy telephone book (look for Fw32w6.zip). DocuPower Pro smashes the limiting eight-character file name imposed by DOS and gives you up to 255 characters to name your documents. You can also open, print, or fax documents, find files, and search for text, plus other file management features (look for Dp31w6.zip). You can download either of these files from the MSWORD forum on CompuServe or from the TSS Software Bulletin Board at (718) 375-6261 (settings are 8 N 1, and support up to 14.4bps).

Fileware, $39.95
DocuPower Pro, $39.95
Total System Solutions
(800) 814-2300
(718) 375-2997
CIS: 70154,2463

Don't think you're limited to products on Microsoft's or WordPerfect's forums. You can also download an army of add-ons from shareware software libraries on America Online and CompuServe. (For downloading instructions, see sidebar.)

The Final Word

While adding utilities to Word and WordPerfect can't help but improve your relationship with your faithful word processor, you don't need all of them. MegaWord, MasterWord, WOPR, and Prime are all great products, but many features are redundant. Not only are there conflicting features, each add-on slows down the initial loading of Word. But what appears lost in agonizing boot-up seconds is more than saved in the extra performance and convenient file management, preview features, and template taming. Now start your modems! ●

by Michael Cahlin

How To Download Shareware Programs

America Online

1. From the Go To menu, select Keyword (or just press CTRL-K).
2. When the Keyword box appears, type **pc applications** and press ENTER.
3. Once in the Applications area, double-click on the Software Libraries icon.
4. From the Software Libraries dialog box, scroll to the bottom of the list and select Word Processing.
5. The Word Processing dialog box will contain an option for Word for Windows and WordPerfect. Double-click on your preference and the list of appropriate files will appear.
6. For more information on each program, click on the Browse icon and read the Description. Select as many programs as you want, then click on Download to receive them.

CompuServe

1. At the ! system prompt, type **go msword** for Microsoft Word for Windows (or **go wpusers** for WordPerfect) and press ENTER.
2. If this is your first visit to this forum, you'll have to join before proceeding. Just type the word **join** and press ENTER. You'll be asked for your name, and after you've entered it and confirmed it, you can proceed. (Don't worry, joining obligates you in no way.)
3. Once you've joined, select 3 (for Libraries) and press ENTER.
4. From the Libraries menu, select the product (4 for Word for Windows, for instance).
5. Once you're in the library of your choice, select 1 for Browse and press ENTER.
6. When asked which libraries you wish to browse, type the same number as in step 4 (otherwise CompuServe will throw everything from *all* the libraries in front of you).
7. Next you'll be asked for keywords. If you want to look at everything, press ENTER. (If you're interested in templates, for instance, type **templates** and press ENTER so you'll see only those files that are or pertain to templates.)
8. Finally, you're asked if there's an age limit to the files you want to browse through. This question is important since the files stored in the library could be several years old and chances are those old files no longer apply. Mostly, however, CompuServe will show you the newer files first, so when things get too historic, you can bail out of the Browse mode. To answer CompuServe's question about age, press ENTER. The first of the files will present itself. ●

Putting Pen To Computer

Pick up an advertisement for a computer product and you'd have a hard time not finding the words "user friendly" somewhere on the page. Sales suffer when hardware and software products aren't as easy to use as the competitors' products. You don't have to look any further than the explosion in sales of software designed for Microsoft Windows to see this in action.

Central to the ease-of-use factor is the interaction between the input device and the interface used to run a software package or an operating system. (An **operating system** provides instructions to the computer so it can interact with software.) When given a choice between using a mouse and Windows or the keyboard and DOS, a landslide majority will vote for the former. (A **mouse** is a handheld device that moves in conjunction with an on-screen pointer arrow and allows you to make selections in lieu of using the keyboard. **DOS**, or disk operating system, is the system software used to run IBM-compatible computers. **Windows** is an operating environment that runs on top of DOS.) After all, the mouse is the easiest input device for computing, right? It fits comfortably in your hand, provides fluid movement, makes carrying out commands simple . . . .

Then again, there is a more natural (and possibly simpler) way to interact with your computer, depending on the type of computing you do. You might find a light-pen and graphics tablet ideal for your work, especially if you do freehand drawing or make handwritten notes on computer printouts. Because you've been writing with a pen for nearly your entire life, it's more natural to use than a mouse. A light-pen provides virtually the same computing power as a mouse.

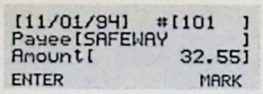
We'll look at some of the pen-based input products available, including a software product that allows you to jot handwritten notes on-screen and have them translated to text or remain in handwritten mode. (How comfortable and easy does that mouse sound now?)

Pen-Based Computing

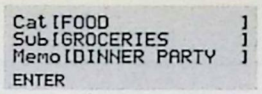
Because of its natural feel, current acceptance of pen-based computing is mainly among artists.

"A tablet is great because it's a more traditional means of drawing," says Pamela Drury Wattenmaker, a freelance illustrator from Redwood City, Calif. "I think a tablet is a lot easier to get used to than a mouse."

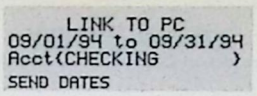
Graphics tablets are especially useful in areas such as computer-aided design (CAD), graphic arts, image creation, and animation. Jack Fulton, a professor of art at the San Francisco Art



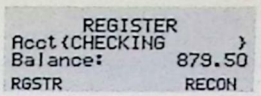
It's Simple. *Every time you write a check, spend cash, or use your credit card, you just type in who you paid and how much you paid them. Right there, on the spot, so you don't forget.*



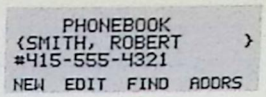
It's Smart. *You track every expense in every account by name and category. So you know exactly how much you're spending and who you're spending it with. And with SoftKeys, you get where you want to go, fast.*



It's Powerful. *It'll store hundreds of financial transactions and create detailed reports for every category and account. And all the financial information you enter can easily be transferred to your computer.*



It's Convenient. *Want to know how much money you have in your checking account? How about total business expenses for the month? Just reach into your pocket or purse and check your balance.*

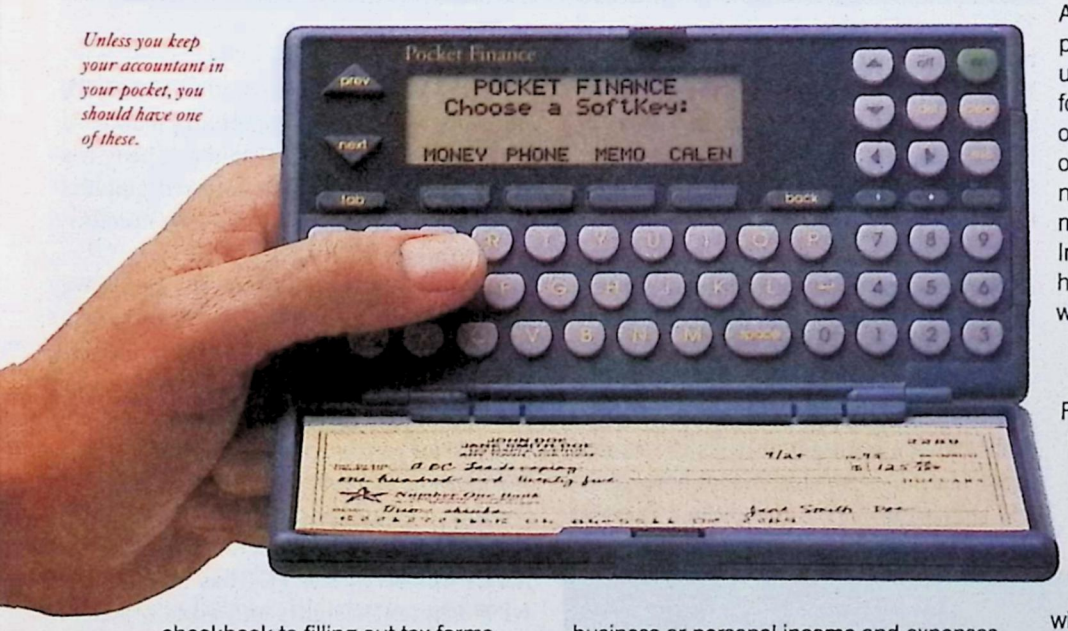


It's Versatile. *Everything you need to know on the go is at your fingertips: all your financial records, phone numbers and addresses, electronic memos, a calculator and even a calendar.*

It's about the size of a dollar, and it keeps track of every penny.

It's called Pocket Finance,™ and that's what it does. It lets you manage every penny that comes out of your pocket by keeping track of where it goes. So you know exactly who got paid, how much, when, where and for what. That makes everything from balancing your checkbook to filling out tax forms a heck of a lot easier. And because Pocket Finance is so small, a heck of a lot more convenient, too.

Unless you keep your accountant in your pocket, you should have one of these.



All your financial information, all in one place.

Pocket Finance can hold over 800 different financial transactions—in an unlimited number of accounts. You don't dread dragging home a bunch of receipts to enter into your computer later because you enter your transactions as they happen. And by creating your own personal categories, you quickly see how you spend your money.

It's very small. It's also very smart.

A lot of really bright people spent a lot of time thinking Pocket Finance all the way through. It's simple and straightforward, but still incredibly powerful. Easy to use features—like *SoftKeys* that give you instant access to all your records, and *FastFill* that remembers your transactions and fills in the details—make entering, viewing and reporting a snap. You can reconcile accounts, summarize business or personal income and expenses by category, and figure out your total financial picture in less time than it takes to tell you about it. What more could you want? How about computer compatibility.

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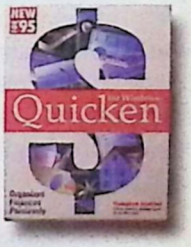

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Institute, has been using computers and graphics tablets for almost three years.

"You have your desktop right there, and you pick up your pen, and you're drawing with it," Fulton says. "I don't think any practicing graphics designer or artist using the computer as a creative medium can work in a free manner without a [graphics tablet]."

How do the light-pen and graphics tablet work? Similar to using an ink pen on a piece of paper, you draw on the graphics tablet with the light-pen, and the pen strokes appear on-screen. The graphics tablet then translates the information generated by the location of the light-pen into a form the computer can use. A typical graphics tablet has a series of sensors just below the tablet's surface. The pointing device (usually a light-pen, although handheld cursors resembling mice are also available) contains a transmitter to let the sensors know its position. A microprocessor in the tablet calculates the relation of the sensors to the pointing device, finding the exact location. The calculation of the location occurs hundreds of times per second. That location then is routed to the computer and eventually to the screen through cabling.

Using The Pen

Light-pens used with graphics tablets attempt to mimic the feeling of using ink pens on paper tablets. Some light-pens, such as CalComp's pressure-sensitive pen, relay information about the pressure you're applying, as well as the tilt and height of the pen. With such pens, greater pressure used on the pen generates a thicker, darker line on the screen. Finding the right pen is vital, Fulton says.

"Make sure you feel comfortable with your pen," he says. "The comfort of the pen is defined in two ways. One is the way it fits your hand in terms of bulk. The second one is the angle with which you use the pen. Some pens with some tablets have to be used in a [non-natural] position."

If the pen and tablet don't feel natural, you'll have difficulty creating the kind of artwork you want. Fulton and Drury Wattenmaker say the choice of a graphics tablet and pen is based on personal preference. Testing a variety of tablets and pens at retail stores, trade shows, and computing classes is important before making a purchase.

Personal Preferences

Drury Wattenmaker originally had a 12 x 12-inch graphics tablet, but it was too big and heavy for her work, which mostly involves creating and touching up freehand illustrations for computer publications and books on her Macintosh Quadra 950. She now uses a 6 x 9-inch tablet (called the DrawingSlate) from CalComp Inc.

"I really like that size," she says. "It's very comfortable. I can put it on the edge of my desk and have it tilted almost like a drafting table. It's definitely what an artist likes to work with."

Drury Wattenmaker says tracing and computer-aided design generally require larger tablets. Fulton frequently uses his 12 x 12-inch DrawingSlate to trace his photographs. He sometimes scans the photos into his Macintosh Quadra 800 computer and then traces the photos with the graphics tablet before combining the two images to create a unique artistic image. He's now working on adding his handwriting to the scanned photographs as he prepares to publish a book containing his photographic artwork.

"My work as a photographer involves not only tweaking the image," Fulton says. "You can do any type of manipulation. . . . I use [the tablet] in virtually all aspects of my work."

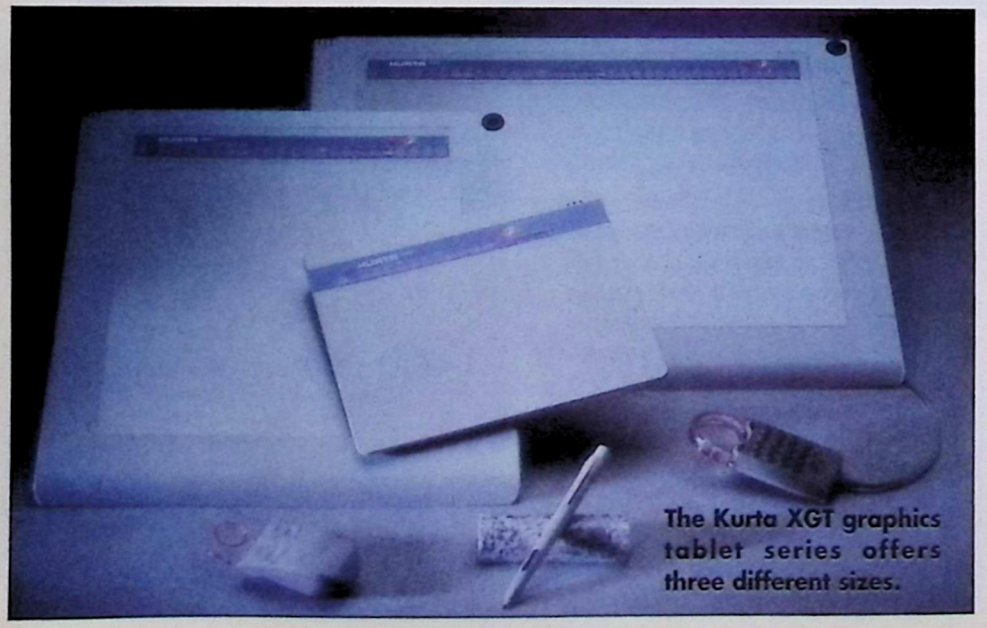
Fulton recommends buying a setup that allows you to program the pen and tablet with macros. (A **macro** is a single keystroke or button click you can assign to represent a series of keystrokes.) You should make certain the tablet can be moved around easily (with a long cord) so it's comfortable for you. Let's look at some of the pen-based input devices that are available.

Kurta

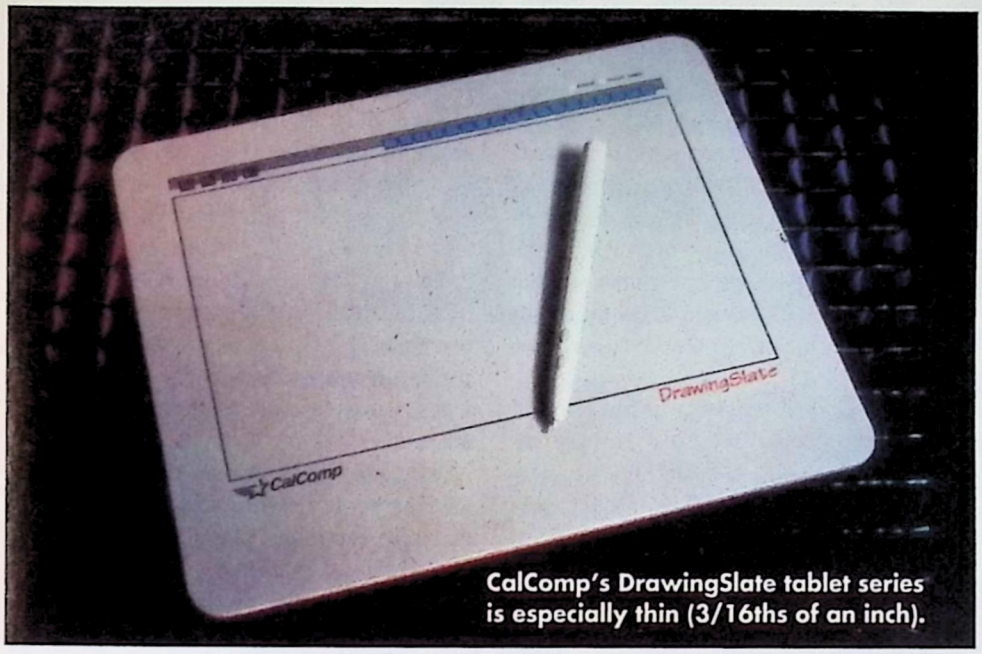
Kurta Corp., which was founded in 1979, entered the pen-based computing market in 1992. The Phoenix, Ariz.,-based company has always designed and manufactured graphics tablets and worked closely with the introduction of cordless pointing devices.

Kurta input systems usually contain a graphics tablet, installation software, and a pointing device. Kurta offers versions for IBM-compatible computers, Apple Macintoshes, and Sun Microsystems. Kurta products are available for portable computers as well.

Kurta's XGT tablet features 256 different levels of pressure sensitivity. (*NOTE: Your art software must support pressure levels before this feature will work.*) The XGT has three tablets with different weights and sizes of active areas: 6 x 8 inches and 1.5 pounds, 12 x 12 inches and 8 pounds, and 12 x 18 inches and 11 pounds. (The **active area** is the area available to use for input. The physical dimensions of the tablets are 8.5 x 11 inches for the smallest tablet, 17.5 x 16.4 inches for the middle tablet, and 17.5 x 22.5 inches for the largest tablet.) Many pointing devices are available, including a pressure pen, a CAD pen, and cordless and corded cursors. (A **cursor** that is used with a graphics tablet looks like a mouse, and has a guided sight with a cross-hatch attached to it, allowing you to pinpoint your location on the tablet.) The tablet's accuracy is within .005 inches (or .127 millimeters). Prices for the 12 x 12-inch tablets begin at $575 for the Kurta graphics package (which contains a Kurta



The Kurta XGT graphics tablet series offers three different sizes.



CalComp's DrawingSlate tablet series is especially thin (3/16ths of an inch).

pressure pen) and $445 for the Kurta CAD package (which contains a CAD pen or a cordless cursor). The larger 12 x 18-inch tablets cost $915 for the graphics package and $785 for the CAD package. The smaller 6 x 8-inch tablet ships with the pressure pen and costs $395.

If you've recently purchased an art software package, such as Fractal Design's *Dabbler* or Corel Corp.'s *CorelDraw 3*, you may have found the Kurta PenMouse tablet included. The PenMouse has an active area of 4 x 5 inches, weighs 16.5 ounces, and has a physical size of 7.75 x 8 inches. Its accuracy (within .015 inches), however, isn't as good as its larger Kurta counterparts.

Kurta's 12 x 18-inch tablet provided solid tracing and drawing capabilities when we used it with Dabbler. We tried the pen and a cordless cursor and found the pen easier to use. Becoming proficient with the pen took some practice, especially since you have to watch the screen rather than the graphics tablet. The documentation included with the tablet didn't deal much with actually using the pen, which forced us to use trial-and-error methods. Installation of the software and hardware took about 20 minutes, but you'll have to edit your system files prior to installing the software to remove references to other pointing devices.

Kurta Corp.
3007 East Chambers St.
Phoenix, AZ 85040-3796
(800) 445-8782

CalComp

CalComp Inc.'s Digitizer Division, based in Scottsdale, Ariz., offers numerous graphics tablets for artists and designers. (CalComp, which is a Lockheed company, is headquartered in Anaheim, Calif.) We'll look first at CalComp's DrawingSlate tablets, which can be used with IBM-compatible or Macintosh computers. They're smaller and lighter than some of the other CalComp tablets and carry a lower price.

DrawingSlate tablets are available in three sizes: 6 x 9 inches of active area, with a physical size of 9.75 x 11 inches and a weight of 12 ounces; the A-size tablet, which has 12 x 12 inches of active area, with a physical size of 17.25 x 16 inches and a weight of 2.5 pounds; and the B-size tablet, which has 12 x 18 inches of active area, with a physical size of 17.25 x 22 inches and a weight of 3.1 pounds. All three tablets are about .175 inches thick. You can use a cordless cursor or a cordless pen with the DrawingSlate tablets, which have an accuracy within .01 inches. The 6 x 9-inch tablet costs $395 and includes a pressure-sensitive pen. (We'll talk about the CalComp pen later.) The A- and B-size tablets cost $395 and $595, respectively, but they don't include the pressure-sensitive pen, which would add about $200 to the tablets' prices. (The packages include cables, installation software, and either a four-button cursor or a standard stylus pen.)

The DrawingBoard III series of tablets is offered in six sizes and is aimed at users needing detailed graphics work. The three smaller tablets in the series have an accuracy of within .01 inches and are 1.7 to 2.6 inches thick, while the three larger tablets have an accuracy within .005 to .008 inches and are .8 inches thick. The smallest DrawingBoard III tablet has an active area of 12 x 12 inches and a physical size of 14.6 x 15.9 inches, weighs 4.1 pounds, and costs $495 to $645. The largest tablet in the series is designed for the high-end (and weight-lifting) user. It has an active area of 44 x 60 inches and a physical size of 58.3 x 71 inches, weighs 69 pounds, and costs $2,995 to $3,145.

The CalComp pressure-sensitive pen generates the feel of using an ink pen on paper. The tilt and height of the pen, along with the pressure applied, are calculated when creating graphics on the tablet. The pen is battery-operated and cordless, which enhances its realistic feel. It contains two buttons along its barrel, which can be programmed with macros for commands like a double-click or an automatic save.

We tested the 6 x 9-inch DrawingSlate with a light-tip cordless pen. Installation of the hardware and software was simple and took less than 15 minutes. All editing of system files wa done automatically. The software lists t changes it made to your system files, allow you to write them down and remove th changes later if you decide to uninstall t DrawingSlate. The cursor follows the pen when it's within about one-half inch of the tablet. All actions normally performed with the mouse were possible with the DrawingSlate. The pen has a double-click macro on one of its buttons on the barrel, which is a handy feature. Performing some customizing of the pen and tablet, such as setting the pen's speed, was difficult, and the documentation was a bit sketchy on this subject.

CalComp Inc.
Digitizer Division
14555 N. 82nd St.
Scottsdale, AZ 85260
(800) 458-5888

FTG Data Systems

Perhaps you've seen National Football League television analyst John Madden drawing lines on the television screen to illustrate the different movements during a play from scrimmage. Maybe you've thought about how useful that technology would be in the office for making notes on documents. FTG Data Systems of Stanton, Calif., has brought that technology to the average PC with *PenDirect for Windows*. An IBM-compatible computer

with at least an 80386 microprocessor, Microsoft Windows 3.1, and 2MB of RAM (4MB of RAM is recommended) is required to use the product, which costs $298 and ships with all necessary hardware. No special monitors or graphics tablets are required. A version is available for Macintosh computers and costs $498. (RAM, or **random-access memory**, is the temporary memory area a computer uses to store programs and documents currently being used.)

The special pen used with the product's interface allows you to point the pen's tip to on-screen items that you'd like to access, rather than moving the pointer arrow with the mouse. Handwritten messages and diagrams also can be made on-screen. The included software, *Microsoft Pen Extensions for Windows*, recognizes and translates handwriting into editable text.

How does the pen work? It determines its position on the screen by picking up light from the monitor when it gets within one inch of the monitor. When you gently press the pen against the computer screen, it behaves like clicking a mouse button. The pen is accurate for a high resolution (up to 1280 x 1024) because it can access individual pixels. (A **pixel** is one of the hundreds of thousands of tiny dots that make up the on-screen image. **Resolution** refers to the sharpness of a computer image. Resolutions with higher numbers yield clearer images.) The pen transmits the signals it receives through an interface box, which interprets them for the computer. The box connects via cabling to your computer through a mouse or keyboard port. The pen is connected to the interface box through a flexible cord much like a telephone cord.

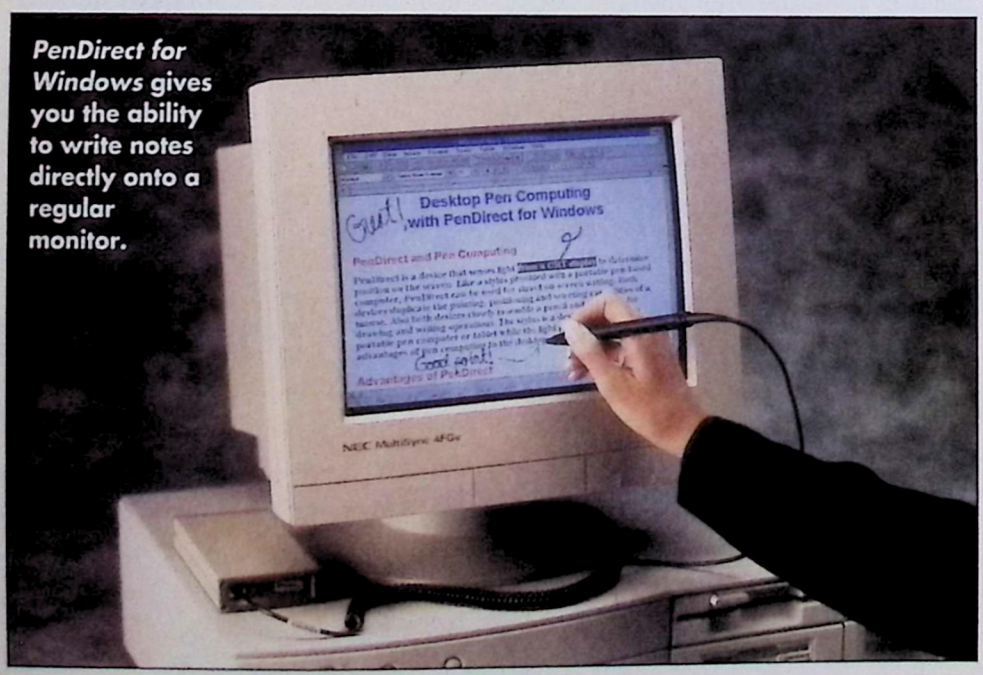
You can access menus and select commands in Windows by tapping the pen against the display screen. Dragging items and double-clicking can be done easily with PenDirect. When the cursor is an arrow, the tip of the pen behaves like a mouse button. When the cursor resembles a pen, you're allowed to write on the screen.

We found the PenDirect hardware and software installation to be fairly simple, requiring about 30 minutes. (*NOTE: Prior to installation, you probably will want to make copies of your .INI files so you can restore them later if you decide to uninstall PenDirect. The software will make some changes to your .INI files that the Uninstall program won't remove.*) Installation of the Microsoft Pen Extensions software took another five to 10 minutes. Instructions in the user guide could present some problems for users who haven't installed hardware devices before, but they are fairly logical. The guide fails to mention that you need to run the PenDirect installation software from the DOS environment, but the software will prompt you if you incorrectly try to install it from Windows. Once you install the pen, your mouse becomes disabled, but the keyboard continues to work.

The pointer arrow will begin to move in conjunction with the pen when the pen is about one inch from the screen. The closer the pen is held to the screen without actually touching it, the better the two work together. (*NOTE: Each time you touch the screen with the tip of the pen when the cursor is an arrow, it's interpreted as a command similar to a mouse click.*) Once you get the hang of using the pen, you'll find it as easy to use as your mouse. Every action we tried with the pen, for which we'd normally use a mouse, was executed properly. With a traditional upright monitor and curved screen, however, the pen is uncomfortable to use because of the long arm reach. A monitor resembling natural writing on a desk would be more comfortable to use with the pen.

Microsoft Pen Extensions does an adequate job of recognizing writing, as long as you print carefully. We found the program recognized 50% to 90% of characters, depending on how carefully they were printed. Once again, the upright monitor with its slightly curved screen made printing legibly with the pen somewhat difficult. Our character recognition percentages increased with use and familiarity with the best methods for printing various letters. The user guide does contain tips for printing the characters properly for easier recognition. A training section helps the program recognize some of your symbols.

If you try the light-pen and later decide you'd like to return to the mouse, an uninstall program is included with the software. You'll have to manually remove the files associated with the pen, and may have to edit your System.ini file, depending on the display resolution you're using.



***PenDirect for Windows* gives you the ability to write notes directly onto a regular monitor.**

FTG Data Systems
8381 Katella Ave.
Stanton, CA 90680
(800) 962-3900

Pen computing certainly is more natural than using a mouse, but requires practice to gain proficiency. If you plan to purchase software allowing you to write on the screen, be prepared to spend hours practicing before you're satisfied with your work. While the pen and graphics tablet can make computer artwork easier, they won't give you newfound artistic ability. That still has to come from your fingertips, just like an ink pen on paper. Unfortunately for art novices, pen computing is just as realistic as it is natural. ●

by Kyle Schurman

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PC MAGAZINE EDITORS' CHOICE
October 25, 1994

REVEAL
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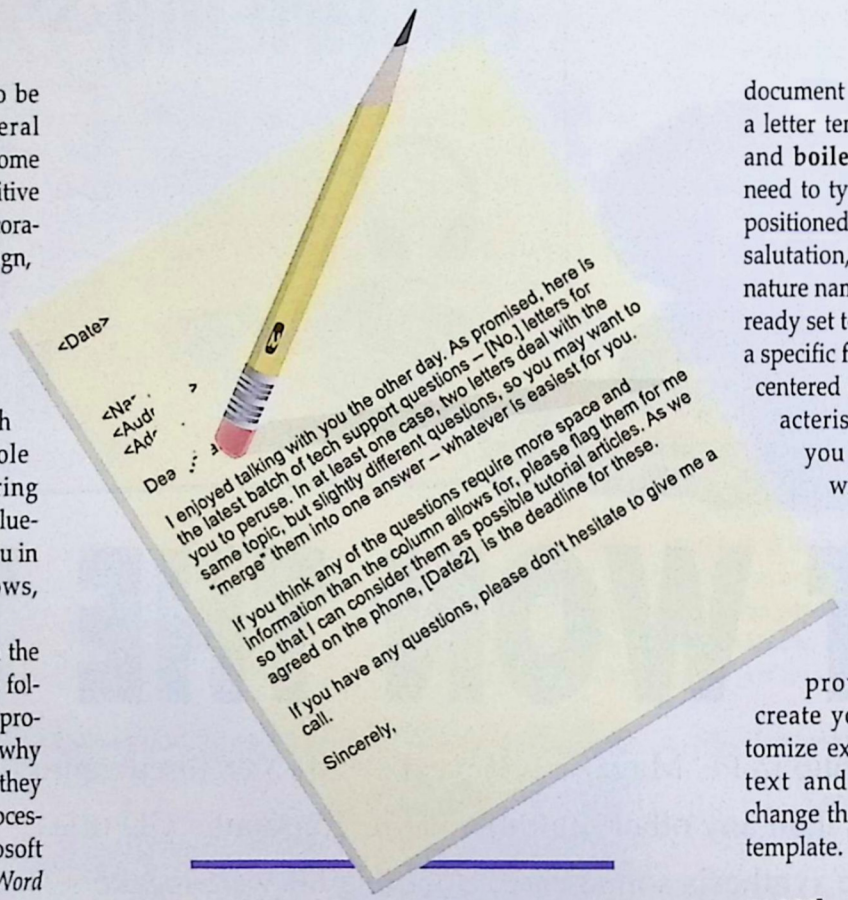
Your Word Processor's Guiding Light

Using Templates In Word, WordPerfect, And AmiPro For Windows



When a task needs to be completed several times, we usually come up with a way to make the repetitive work easier. When painting a decorative border with a repeating design, the paint application is easier if you use a stencil or template. When drilling holes for door hinges or cabinet knobs, it's faster to make a board with pre-drilled holes to use for hole placement rather than measuring each time. And when drawing blueprints, templates quickly guide you in the placement of doors, windows, and closets in your designs.

Similar guides are available in the majority of word processors. The following will explain what a word processing template does, when and why you'd want to use one, and how they work in the three main word processors for Microsoft Corp.'s Microsoft Windows: Microsoft's *Microsoft Word for Windows* 6.0, *WordPerfect for Windows* 6.1 from the Novell Applications Group, and Lotus Development Corp.'s *AmiPro* 3.1.

What Is A Template?

A word processing **template**, sometimes referred to as a **style sheet**, is a guide or pattern for all of the documents that fit into a certain category, such as letters, memos, or fax transmissions. When you open a template, a document appears on-screen with preset margins and text format appropriate for a document in its category. For example, a letter template has spacing, margins, and **boilerplate** text (text that you'll need to type over and replace) already positioned for the date, inside address, salutation, body text, closing, and signature name. The text in templates is already set to a certain style as well. It has a specific font, type size, alignment (like centered or justified), and set of characteristics (like bold or italic). As you replace the boilerplate text with your own, the words will change but the style stays the same.

You're not stuck with the template categories your word processor provides, though. You can create your own templates or customize existing templates by adding text and graphics. You can also change the style of the text found in a template.

Why Use Templates?

Templates are quick tools to help you work smarter and faster. Let's go through a short list of reasons why you should use templates.

• **Templates make formatting faster and easier.** When you format a document without a template, you must specify all of the formatting details each time you format a portion of text. This is tedious because of the dozens of formatting options from which to choose. With a template, however, the styles are preset. All you have to do is type in the text.

• **Templates make your documents more consistent.** Once you set up a template, you can use it repeatedly to produce documents within a specific category. You'll have a standard look for each of these documents, making the appearance of your work more consistent.

• **Templates let you concentrate on what you want to say, rather than how to format your information.** Some word processor users get so caught up in the appearance of their documents that not much thought is put into the documents' purpose. When you use a template, you can quit worrying about the format of the document and pay more attention to what you're typing.

Although templates sound useful to the majority of users, few actually use them. Once you understand and use templates, however, you'll wonder how you made it without them. To help you reach this point, we will cover some of the basics of templates used in today's most popular word processors.

Using Templates In Microsoft Word

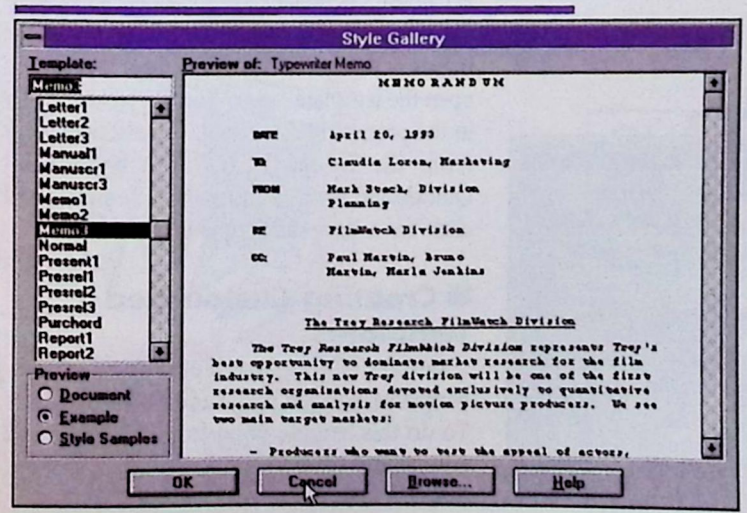
Every document in Microsoft Word 6.0 is based on a template. Besides the standard text, graphics, and formatting associated with templates, Microsoft expands the template definition to include things like customized menus, toolbars, and macros. (A **menu** is an on-screen list of commands. A **toolbar** is an easy-access bar with format functions and other user-defined commands. A **macro** is a user-created command that replaces several keystrokes or mouse movements.) Inclusion of these tools in templates lets you customize particular documents and design a unique environment to meet your needs.

Word provides 24 templates for the following categories: brochure, directory, fax cover sheet, letter, manual, manuscript, memo, presentation, press release, report, resume, and thesis. Each category is divided into one or more of four template families offering a variety of business and casual looks. These include Classic, Contemporary, Typewriter, and Elegant.

If consistency between documents is important to you, you'll want your documents to look similar. To do this, use templates from the same family. For example, you could use the Contemporary press release template and the Contemporary letter template to create an informational package for your local newspaper.

To help you decide which template family you prefer, preview the format and design of each. To do this, select Style Gallery from the Format menu. A Style Gallery dialog box will appear with a list of template names on its left-hand side. As you scroll through this list, notice that the files have numbers in their names like Presrel1, Presrel2, Presrel3, and Presrel4. The 1 represents Classic style, 2 Contemporary style, 3 Typewriter, and 4 Elegant. To see a template, highlight the filename and select the Example option in the Preview box found directly below the list of template names. Word will display a sample document formatted with the selected template's styles in the box to the right. Click the Cancel button to exit from the Preview box.

***Microsoft Word's* Style Gallery dialog box lets you select and view templates.**



Creating Documents With Templates

To create your document, select a template. To do this, choose New from the File menu. A New dialog box appears on-screen. Select the name of the correct template from the list on the left-hand side. Make sure the Template option is selected in the New box on the lower right-hand side. Then click the OK button. The new document will appear on-screen.

As we mentioned earlier, each template contains a collection of design styles for most elements of a document like titles, headings, bulleted lists, headers and footers, footnotes, and captions. A style is like a customized format command that applies several formats at once.

To apply a different style to a headline, for example, select the heading with your mouse. Highlight the heading and select a different Heading style from the Style box, located directly above the document's page on the left-hand side. Word applies all of the new style's formatting (font, bold, etc.) in a single step.

As you apply styles to your document text, remember there are two style types. Paragraph styles format entire bodies of text like body paragraphs and headings. Character styles format specific words and phrases like page numbers or special words you'd like to emphasize. In the Style box, paragraph style names are listed in bold and character style names are in regular-weighted text.

If you've created a document with a certain template and decide you don't like its appearance, you can quickly change it by applying the styles from a different template family without re-creating the document in a different template. For example, to change a document created on the Classic memo template, apply styles from the Contemporary or Typewriter memo templates by opening the document, choosing Style Gallery from the Format menu, selecting the new template style from the Template list, and clicking OK.

Creating Customized Templates

You can customize a template by adding text or graphics or by changing styles. To modify a template, choose Open from the File menu and select Document Templates in the List Files of Type box, located on the lower left of the Open dialog box. If no templates appear in the File name box, you may not have the TEMPLATE directory open. Once the directory is open, choose the template you want to alter and click OK. If you want to keep the original template as well, choose Save As from the File menu, type a name for the template, and click OK.

Next, customize the template. For example, you can insert text you use often, add a

company logo, or change a particular text style. When finished, choose Save from the File menu. Now when you want to create a document with this template, it will be located in the pop-up template that appears when you create a new document.

Using Templates In WordPerfect

Before releasing its new version of WordPerfect for Windows, Novell Inc. researched the use of word processors. This research showed that most people were not using document templates because they either didn't know how to use them or that they were even there. If they did find them, they didn't think the supplied templates were relevant to their work.

To address these concerns, newly released WordPerfect version 6.1 ships with more than 50 new grouped templates that appear every time you create a document. Like Microsoft Word, WordPerfect templates contain text, graphics, formatting, macros, toolbars, and menus.

The templates found in WordPerfect are organized in groups, each representing a specific type of document. The groups include business, calendar, envelope, legal, letter, main, memo, publish, report, and resume. A set of templates appears in each group. For example, the letter group contains templates for blank, contemporary, traditional, and trimline letters.

Creating Documents With Templates

To create a document, first open a template that corresponds to the type of document you're creating. To do this, choose New from the File menu. A New Document dialog box will appear on-screen. On the left-hand side of this screen is a Group list. When you highlight a group, a list of templates available in that group will appear in the Select Template box in the middle. In this box, highlight the template you wish to open and click the Select button on the right-hand side of the screen. You can preview a template by clicking on View.

A Personalize Your Templates message box now pops on-screen. If this is the first time you've opened a template in WordPerfect, enter your personal information in this box and choose OK. In the future, WordPerfect will refer to this information when using other templates.

After entering your information and clicking OK, the Template Information box will appear. Here WordPerfect asks for information specific to the document on which you're working. WordPerfect will use this information to fill in the template, making your job even easier. The information prompts will vary from template to template.

Editing A Template

From time to time, you may want to change the format of an existing template. For example, you may want to add a blank line to a letter closing or italicize a heading. To edit a template, choose New from the File menu. Choose a group in the Group box and highlight the template you want to edit from the Select Template box. Then choose Edit Template from the Options menu, which appears when you click the Options button.

Type or edit any text or formatting you wish in the template. When you're done changing its appearance, choose Exit Template from the feature bar in the upper right and choose Yes when prompted to save the template.

WordPerfect templates have information in angle brackets (like <name>) and square brackets (like [subject]). These are called **fields**. Fields in angle brackets are replaced with the personal information you provided when you first opened a template. Fields in square brackets are replaced by the information you're prompted for when you open a specific template.

Editing Prompts In A Template

WordPerfect uses the information gathered in prompts in the Template Information dialog box to fill in a template. To create, edit, or delete these prompts, use Build Prompts on the Template feature bar.

To do this, choose New from the File menu. Select a group from the Group box, highlight the template you wish to edit from the Select Template box, and choose Edit Template from the Options menu. Then choose Build Prompts from the Template feature bar (it's the second button from the left).

NOTE: The Prompt Builder dialog box that appears controls only the prompts in the Template Information dialog box that appears when you open a template. If you add a prompt to the list, you should include the corresponding information in the template, such as the word **To:** *to match a* To *prompt in a memo. Likewise, you should delete corresponding information from a template if you delete a prompt.*

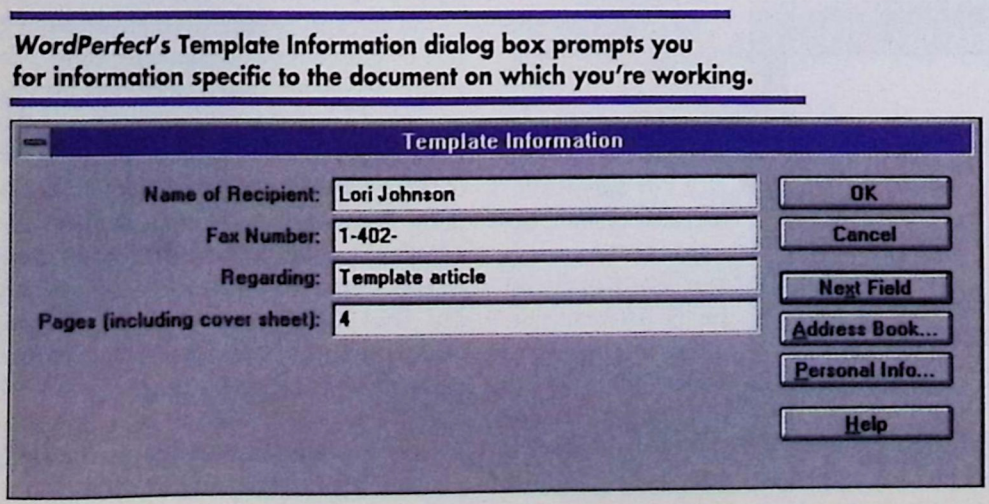
To add a prompt, choose Add and type your personal information for the prompt (you may add up to 12 prompts at a time). After adding a prompt, place the cursor in the template where you want the prompt information to appear. Select the template prompt in the Prompt Builder dialog box and choose Paste. The name of the template prompt is inserted in your document between left and right square brackets.

Choose OK when you've added all of your prompt information to the template. Place the cursor where you want it to appear when you open the template (after WordPerfect has filled in the prompt information). Choose Bookmark from the Insert menu, then choose Set QuickMark. Finally, choose Exit Template and click Yes to save the template.

Creating Customized Templates

Besides editing WordPerfect's 50 existing templates, you can create additional templates. To do this, choose New from the File menu and choose New Template from the Options menu.

***WordPerfect's* Template Information dialog box prompts you for information specific to the document on which you're working.**



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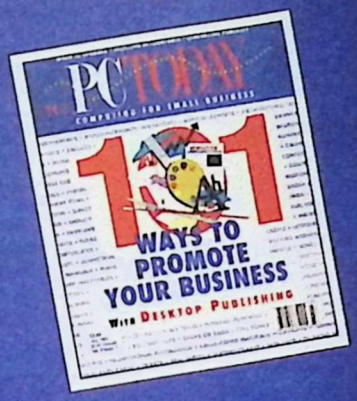

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A blank template screen will appear. Type any text you want in the template and use any WordPerfect feature you'd like to format the template. When you're finished, choose Exit Template from the feature bar, then choose Yes to save the template. At this time, you'll be prompted for a description for the template and for a template name. You'll also need to select the group in which you want to store the template. After you've done all this, click OK. The template is now saved.

Using Style Sheets In Ami Pro

Templates in Lotus Development Corp.'s Ami Pro 3.1 are called style sheets. Each style sheet found in Ami Pro includes formatting instructions for several paragraph styles and one page layout.

As expected, the paragraph styles include all of the text formatting information and determine how text in a document initially appears. The page layout includes all of the page formatting and dictates the way the pages in a document appear.

Ami Pro ships with 57 style sheets, including formats for letters, articles, calendars, dissertations, envelopes, expense reports, fax cover sheets, indices, invoices, labels, memos, newsletters, outlines, overheads, phone lists, press releases, proposals, reports, term papers, title pages, and tables of contents.

As with the other word processors, you must select a style sheet to determine the initial appearance of a document before you can create it.

Creating Documents With Style Sheets

Your first step in creating a new document is selecting New from the File menu. A New dialog box will appear on-screen. Inside this box is a scroll-through list of style sheets. Highlight the style sheet you'd like to use in this box. You now have to make one of three choices when opening the template, to open the formatting information in the style sheet, the formatting information and any text or graphics found in the style sheet, or the formatting information, text, graphics, and the automated features of the style sheet.

By selecting a style sheet, you choose its formatting options. If you'd like to include the text and graphics found in the style sheet, make sure the With Contents box has an X in it. Likewise, if you want to include the automated features of the style sheet, the Run Macro box must also have an X.

NOTE: If you're not sure which style sheet you want to select or whether you want to include the text and graphics, you can X the Preview box. Doing so will display any text, frames, pictures, or tables included in the selected style sheet in Full Page view in a separate window.

Once you've selected everything you want included in your template, click OK. A document using the selected style-sheet features will appear in an Untitled window. If you selected With Contents, the style sheet's contents appear in the document. If you selected Run Macro, Ami Pro will prompt you for information and automatically fill in parts of the document. You may now type in the desired text.

You can change the look of your document by changing from the document's current style sheet to a different one. To do this, choose Use Another Style Sheet from the Style menu. A dialog box will pop on-screen. Select the new style sheet by highlighting the sheet in the Change To box. Choose OK to return to the document. Ami Pro will reformat the document's appearance.

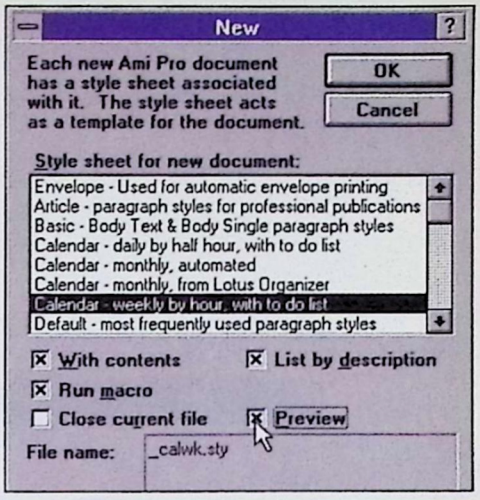
Creating Custom Style Sheets

To create a new style sheet, you modify an existing style sheet and save the changes to the style sheet. When you change paragraph styles or the page layout in a document, only that document contains the changes. If you want to access the modified layout with another document, you need to save the changes to the current style sheet or to a new one.

To do this, choose Save as a Style Sheet from the Style menu. A dialog box pops on-screen. In it, type the name of the new style sheet. If you want to save the changes to the current style sheet, leave the current filename as it is.

If you want the text, graphics, and tables included in the new style sheet, make sure the box next to With Contents is X'd. Likewise, if you want Ami Pro to run a macro each time you open this style sheet, select Run Macro and specify the desired macro in the box to the right of the Run Macro field.

To display a list of available macro files, press the down arrow key with your mouse. After the macro is selected, click on OK. Ami Pro will now move the formatting information found in the document to a new style sheet.



If you want to include graphics and automated features linked to a style sheet in your *Ami Pro* document, make sure the With Contents and Run Macro boxes are *X*'d.

The Guiding Light

As you use your word processor's templates, you'll discover a variety of benefits. As you see how useful templates are when creating simple, short documents like letters and memos, you'll be able to imagine and appreciate how handy they can be for long, complex documents like a report with a title page, table of contents, multiple sections, and an index.

With templates to guide your way, you'll soon discover that the creation of great-looking documents is as simple as following the light! ●

by Lori Beckmann Johnson

For More Information:

Microsoft Word for Windows 6.0
Microsoft Corp.
(206) 882-8080

WordPerfect for Windows 6.1
WordPerfect
Novell Applications Group
(800) 451-5151

Ami Pro 3.1
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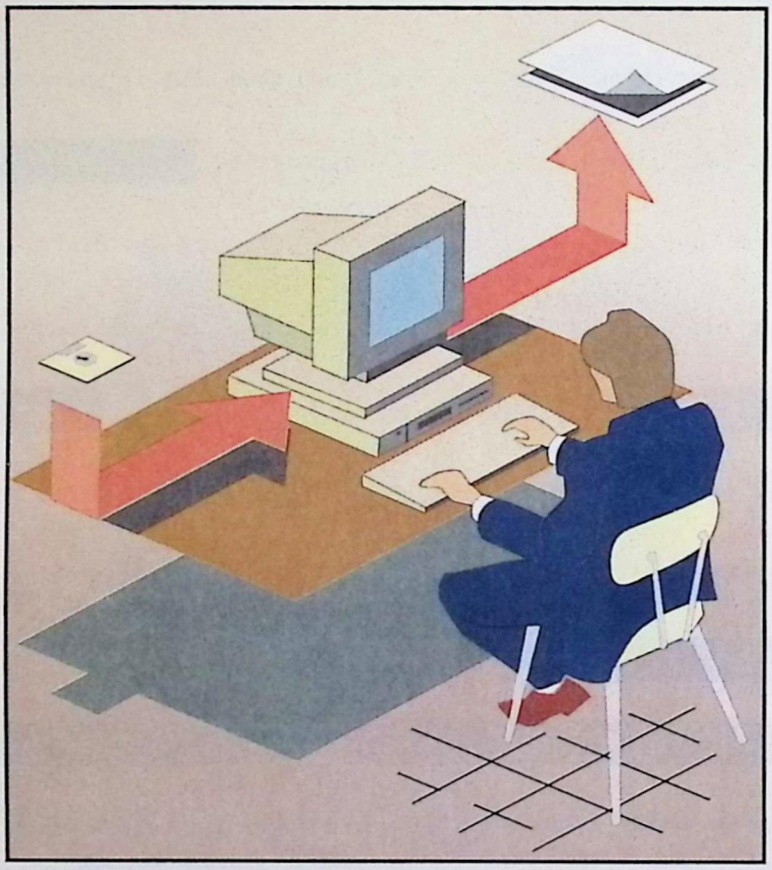
Creating Letterhead, Part II

Programs That Put Your Designs On Paper

Before you sign your name to that letter you're sending, take a closer look at it. What does your letterhead say about you? Perhaps it says that you're boring, or that you have no sense of design or creativity, or that you simply threw it together at the last minute. If so, you might think twice about signing your name to it.

A plain white sheet of paper with uninteresting type and a signature at the bottom won't turn too many heads. But the right design may get the attention you're seeking.

Last month, we gave you some design tips for creating your own letterhead in "Creating Letterhead, Part I." This month, we'll help you put those tips to use with some software programs designed for creating letterhead.



Many basic publishing programs have all the functions you need to create letterhead. Other programs have specific sections containing letterhead designs and templates you fill in with your own information. There is also add-on software, which installs on top of a word processor and adds letterhead templates to it. Any of these programs let you use the designs provided or put your own creativity to work.

We'll give you a sampling of various programs. See what works best for you.

Print Artist

Print Artist CD Edition is a Windows program from Maxis that helps you design 10 different types of documents, including signs, business cards, certificates, postcards, calendars, envelopes, and letterhead. Just double-click the Letterhead box to begin.

There are several categories of letterhead layouts, each containing its own selection of designs. Choose layouts for personal, small business, or corporate letterheads, use templates to fill in data, or start with a blank page and use the program's features to design an original letterhead.

Once you've selected a letterhead background, it will show up on the main screen where you can work with it. The full page will appear, but you can use the View menu to zoom in on text and images or zoom out for a wider view.

The program's designs contain images and sometimes text. To highlight an image, click on it once. This puts a frame around the image, letting you move or resize it on the page. Double-click on the image to access the box allowing you to change it. Here, you can browse through lists of graphics and click on the one you want.

Some designs include wording to explain where you can place your text. To change the text, double-click on it. In the box that appears, you can enter your text and select any special characters. Click once on the text to highlight it. When a frame appears around the text, you can drag it to move or resize the text.

The first two options of the Font menu also resize text. Choose the Point Size option to make type larger or smaller. With this option, you can choose a particular point size for your type, or just fit the letter to the frame and change the size of the frame on the page.

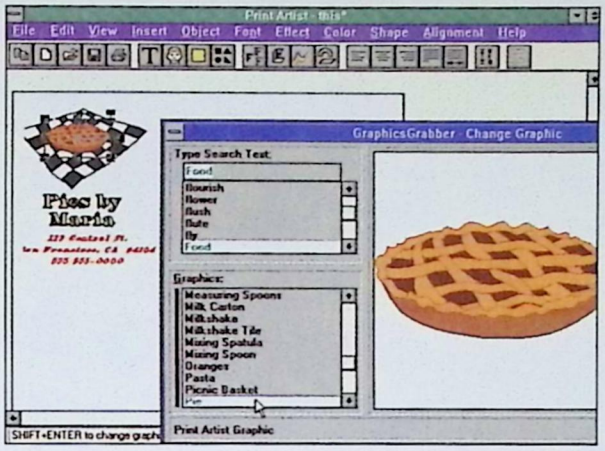
When using a template to design your letterhead, boxes are arranged on the page to show where text and graphics can be placed. Double-click on a graphics box (one with an *X* in it) to select and fill it. The Graphics Grabber will display lists of images from all categories. Click on names of items to see what they look like, then choose one to make it appear on the page. From there you can move and resize it.

Text boxes are empty, but you can enter words in them by double-clicking on the box. If a text box is centered on the page, the text inside will be centered; you don't have to format it yourself.

When starting with a blank page, choose the page size, such as 8-1/2 x 11 inches or 11 x 17 inches. Begin designing your layout at the Insert menu. Insert text, graphics, borders, backgrounds, frames, and shapes. For borders, backgrounds, graphics, and shapes, the program provides lists of designs from which to choose. When you enter text, you can highlight it and choose a text alignment, such as left- or right-justified or centered.

Once you've finished your letterhead design, you're ready to print.

Print Artist CD Edition, $50
Maxis
(800) 336-2947
(510) 254-9700



***Print Artist* from Maxis has numerous graphics to use in your letterhead design. Pick a category, then search through the list of graphics in that category.**

Print Shop Deluxe

Print Shop Deluxe from Broderbund Software Inc. has five different projects to work with, such as greeting cards, banners, and letterhead. The letterhead option lets you make either a regular 8-1/2 x 11-inch letterhead or a notepad-sized letterhead at 5-1/2 x 8-1/2 inches.

Your next option is to choose one of the program's many backdrops, such as a tropical-coastal scene, a display of tiny gifts, or simply a blank page. Next, pick a letterhead layout to show you where text and graphics will be placed. There are 38 different layouts. The No Layout option lets you design your own.

When you've chosen a layout, the full page will be displayed on-screen. Use the View menu to zoom in or out, or to view the page at 25%, 50%, 150%, 200%, or actual size. If you're using a predesigned layout, boxes showing bear faces are for graphics and those with a capital *T* are for text.

Start by double-clicking on a text box to enter text. In the Edit Text box, choose from a list of fonts and define the style of the text, such as bold, italic, or shadowed. Use the pull-down menu to pick a type size and define the horizontal and vertical text alignments. Type text into the box on the right, then click the Preview button to see what it will look like when printed. When you're satisfied, click OK.

Double-click a graphics box to browse through the picture list. Once text and graphics are on a page, you can move them to change the layout. Just highlight and drag them.

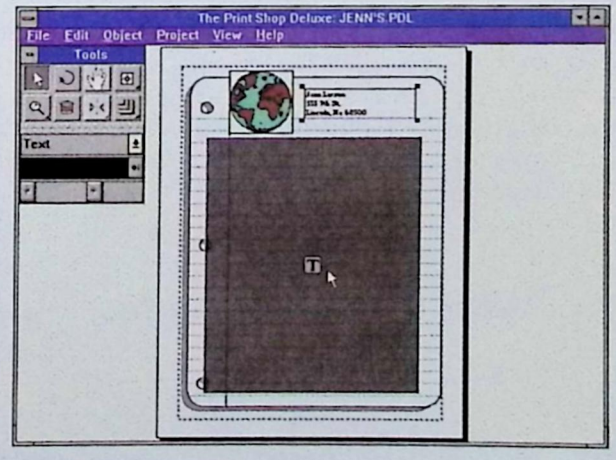
Another way to make changes is to use the Tools box, containing eight different tools and three selectors. The Pointer tool highlights (selects), resizes, and moves items. When objects are selected, you can rotate them, delete them, flip them vertically or horizontally, or put frames around them using other tools in the box. When your project is larger than the on-screen window, use the Hand tool to change the view of your document. Use the New Object tool to add text and graphics to a project. The Zoom tool lets you zoom in or out on the page.

Directly under these tools is the Item Selector. With it, you can choose an object to apply color or shading. Click on the Item Selector's down arrow to see a list of the items you can manipulate. The list will change depending on what's selected on the letterhead page, such as a graphics box, a text box, or the background. One of the listed items may be the backdrop, or background. If you select this item, you can change it with the other two selectors.

Use the Color Selector to apply color to the item you've chosen in the Item Selector. If you select a multi-colored graphic, a color spectrum will appear in the Color Selector. You can't change the color of a multi-colored graphic. If you select another item or use a monochrome graphic, however, you can click the arrow of the Color Selector to view the selection of colors. Use the arrow to pick a new color for the selected item.

The Shading Slider at the bottom of the Tools box lets you change the shading of the selected item. Use the right and left arrows to increase or decrease shading. For example, you can decrease the shading of a colored background to make the colors more subtle, or increase shading to intensify color.

Use the program's menus to edit and manipulate objects, add effects, change the background or layout, and print the letterhead when it's finished.



With *Print Shop Deluxe* from Broderbund Software Inc., pick any background, such as this one that's designed to look like notebook paper, and add graphics and text on top of it.

Print Shop Deluxe, $40
Print Shop Deluxe CD Ensemble, $80
Broderbund Software Inc.
(800) 521-6263
(415) 382-4400

Q-Prints

Q-Prints is a Windows program from Queblo, a division of The Stationery House Inc. Queblo provides specialty papers and preprinted design papers for items like letterhead, brochures, business cards, and envelopes. Queblo will print your information on your choice of their papers, but provides the Q-Prints program so you can do it yourself.

When you start Q-Prints, you can view sample products, go through the tutorial to learn how to use the program, or just get started.

Open the File menu and click on Product Selector to begin. Using the Product & Style Selector box, you can find a design and layout for your letterhead. The lists of designs and styles are the same as those found in Queblo's catalog used by customers to place orders.

Start by selecting a category from the Queblo Product Class box. Both of the Executive Stationery and Designer Papers categories have some letterhead designs. Select one of these categories, then open the Product Name list. (In the Designer Papers category, letterhead designs are under Action Headings, Classic Motifs, and Textures.) Click on a product name.

Each product name has its own list of numbers in the Product Number box. These numbers represent designs and correspond with numbers and designs in Queblo's catalog. (If you're going by design numbers, you also could use the Product Numbers Only category in the Product Class box.) If the product number you select has varied style sheets, or different layouts, they'll be displayed for your choosing in the Style Sheet list.

When you've made your selections, click the Accept button to put the design on the main screen. Use the Display menu to change the size of the page. The Fit To Display option shows the full page as it appears when you select it. Switch to Actual Size to see the text more clearly.

To enter text, open the List Editor from the Text menu or double-click anywhere on the page. The List Editor has a text box where you enter text. Each different piece of information is a different field. For example, the company name, the address, and the address of the person receiving the letter are three different fields. Enter text one field at a time. Choose fields with the Field menu or scroll bar. To change any text on the page, click once on it and type in new text.

The Display menu also helps you work with text. You can put frames around text, display field names rather than the text you've entered, or make the background design drop out so you can work with text more easily.

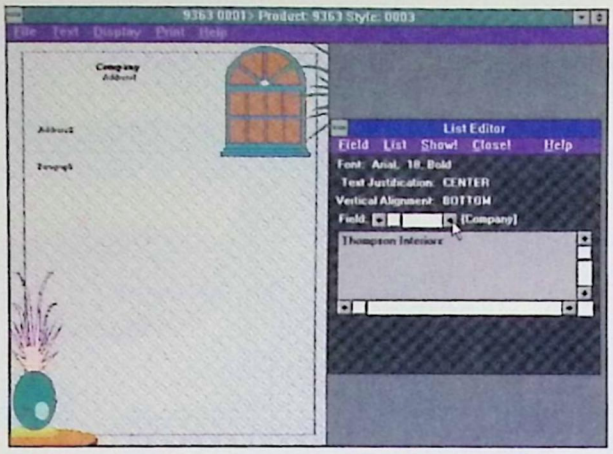
Include additional clip art from the collection in the File menu. The program has a small selection of effects like arrows, borders, and shapes. Or import your own clip-art images.

If you don't use one of Queblo's designs, you can still design letterhead by choosing Open WorkSheet from the File menu. Add text and import clip-art images to create your own design.

Q-Prints, $49
Queblo, a division of The Stationery House Inc.
(800) 523-9080

Paper Templates

If you already have a word processor, you can install letterhead templates on top of it, giving you the ability to design letterhead from inside your word processor.



***Q-Prints* from Queblo is full of letterhead designs that are also found in the company's specialty papers catalog. Add your information using the List Editor.**

PaperDirect Inc. provides specialty papers and preprinted designs for items like letterhead, envelopes, and brochures, which you can order through their catalog. PaperDirect can print or design letterhead for you, but the company also provides software templates to order and install for use with certain word processors. The one we looked at is *Paper Templates for WordPerfect 6.0 for Windows.*

When you install the templates, PaperDirect's On-Line Manual is included. The manual is accessed through its own icon, separate from the word processor. The manual consists of an introduction to help you use the manual, step-by-step instructions for using the templates, special instructions for specific tasks, printing information, and some frequently asked questions.

The templates are accessed from inside your word processor. The On-Line Manual tells you exactly how to access the approximately 320 templates offered. You will need to open the directory that contains the PaperDirect template files, which in WordPerfect for Windows takes several steps.

With *Paper Templates*, your only limits lie in the word processor you're using.

Start at the Tools menu, choose Macro, then click on Play. In the appearing box, click on the icon box that brings up lists of files and directories. Here, select the PDIRECT directory and the Pdirect.wcm file. Now the templates are available.

There are templates for business cards, postcards, labels, and more. The Laser 1-Passes category has some letterhead designs, but most have accompanying label designs. This may come in handy at times. You can choose the Desktop Designs category, however, for basic letterhead designs.

After selecting a category, you are given a list of template designs to choose from. The numbers for each design correspond with design numbers in PaperDirect's catalog. Once you've chosen a template, the program takes you through a series of instructions to help you fill in your letterhead. The program prompts you to enter text, unless you specify that you'd like to enter it on your own. Before entering text, you can choose a font or use the default one.

Text consists of features such as the letterhead title, subtitle, names and addresses, and the letter itself. Text alignment, fonts, and type size are automatically formatted by the template.

When you're finished entering information, you can save, edit, print, or work with the document the same as you do with any other word processing document. Change views to get a look at the entire page. Or use the word processor's graphics capabilities to add images to the letterhead. You can even print the layout you've created onto paper with a preprinted design. Your only limits lie in the word processor you're using.

Paper Templates for WordPerfect 6.0 for Windows, $39.95
PaperDirect Inc.
(800) 272-7377
(201) 271-9200

The Finished Product

So, what do you have now? Much more than a white piece of paper with black text on it, no doubt. With a professional layout and an appealing design, your letterhead tells everyone it reaches that you mean business. Now, don't you feel better about signing your name? ●

by Jennifer Larson

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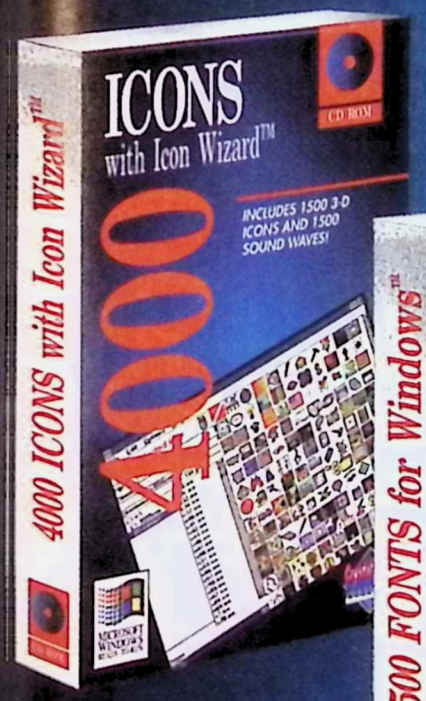

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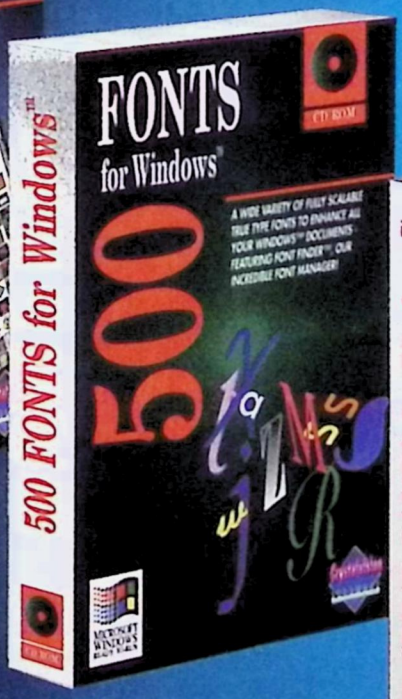

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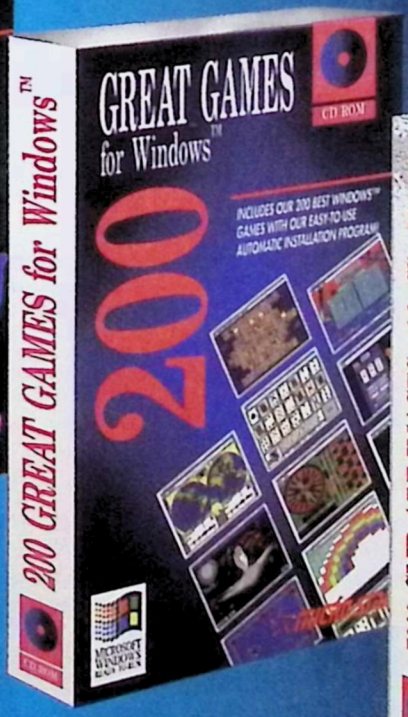

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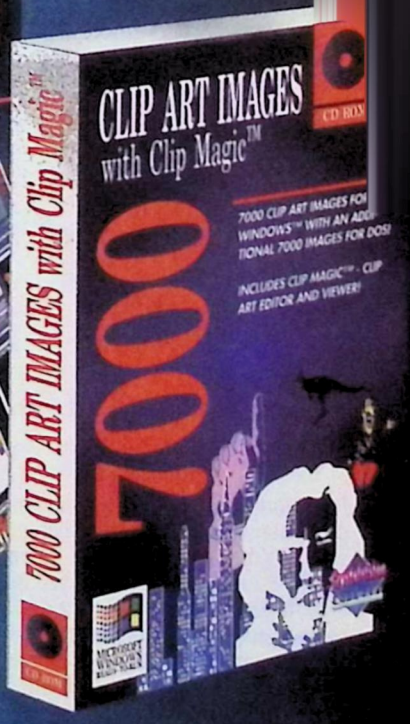

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Editing Your Own Startup Files

Part II Config.sys

Maybe you're adding a new mouse to your system, or installing a CD-ROM drive so your children can take advantage of the educational software flooding the market. Whatever hardware you're adding to your system, you need to edit your Config.sys file with the information your computer needs to communicate with these devices. Editing a Config.sys file is as easy as editing your other startup file, Autoexec.bat (see Part I of this series in the January 1995 *PC Novice*), if you know what you're looking for.

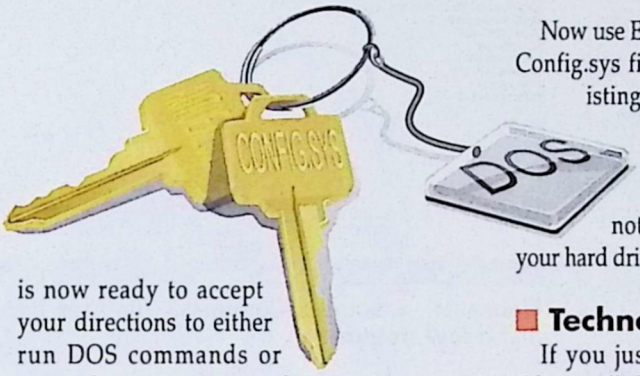
As you learned last month, you don't need a rocket science degree to edit your startup files. You do, however, need to have a little confidence and caution, as well as backup copies of your efforts on diskettes. Backup copies of Autoexec.bat and Config.sys files are extremely helpful if something goes wrong, or if you decide to undo your changes, because all you have to do is copy the backups onto your hard drive.

Startup File Basics

Before we get into the nuts and bolts of editing and troubleshooting startup files, let's briefly review their purpose and how they are used by your PC (as with Part I, we will be using DOS versions 6.x).

Startup files contain statements that tell your computer how to communicate with other programs. The startup files normally run once during a computing session—when you turn on your computer's power switch. Your Config.sys file is run first, followed by your Autoexec.bat file.

You can force your startup files to run again by "rebooting" (or restarting) your computer. Each time you reboot your PC, the contents of your Autoexec.bat and Config.sys files are run as though they were lists of individual DOS commands. When your computer digests all of the commands and statements in both files, a DOS prompt appears on your screen. DOS



is now ready to accept your directions to either run DOS commands or run such programs as word processors or games.

Using DOS Editor

Let's take a few minutes to view your startup files without making any changes. Using the Change Directory (CD) command, switch to your DOS directory. (Your DOS directory will invariably be on your C: drive. To change to this directory, type **cd c:\dos**.) To start the DOS Editor program, type **edit autoexec.bat** or **edit config.sys** at the prompt. To exit Editor, call up the File menu with ALT-F, then choose Exit.

We'll start by making a new Config.sys file—if one doesn't already exist. Restart the Editor program. The title in the center of your screen will tell you that an empty, untitled file has been opened for you. Ignore this offering until you find out if you have a Config.sys file.

Call up Editor's File menu, then choose Open. Make sure that Editor is searching your root directory by double-clicking on -C- on the list of available drives and directories in the Dirs/Drives list box. Now Editor can open any file in the root directory of your C: drive. Type ***.sys** and press ENTER. If you see a Config.sys file in the Files list box that means you don't need to create a new one. Click on the Cancel button. If you don't see a file called Config.sys, click on the Cancel button, call up Editor's File Menu, and select File Save As. Type **config.sys** and click on the OK button to create the new file.

Now use Editor to look at the contents of your Config.sys file—newly created or already existing. From Editor's File Menu, select Open to get its dialog box, then double-click on Config.sys. (If you can't find the file, you're probably not looking in the root directory of your hard drive.)

Techno-Babble Translated

If you just created your Config.sys file, Editor will display an empty file with the filename at the top of the text area. If you already have a Config.sys file, a list of text will appear as the "contents" of the file.

Figure 1 shows you what a Config.sys file ca look like. The first three lines tell the comput how we want to set up our computer's memo capacity to best serve Windows or other programs that need extended memory. Note that each line begins with "DEVICE=", which tells the computer that it is expected to load and store some sort of program into its memory.

The "BUFFERS=" statement is provided for programs needing special bits of memory set aside expressly for their use. Values assigned to the Buffers statement can vary from 10 to 100, depending on your program's needs. Look to your program's documentation for more on the (number) value you should use for Buffers.

The "FILES=" statement determines the number of files that DOS can have open at any given time. Note that Figure 1 shows you that a value of 40 is in use. Your computer should have a value somewhere between 10 and 70 under most circumstances. Start with 10, increasing that value only when one of your programs makes a special requirement of it.

The "FCBS=" and "STACKS=" lines manage conventional memory. Use the statements shown in Figure 1 for your PC as a good starting point. You can always change them later if you need to.

The "BREAK=" line tells your computer to react quickly to your depressing of the BREAK

key. Always include this line in your Config.sys file so you can press the BREAK key to stop execution of a DOS program.

The "LASTDRIVE=" statement tells DOS that you might add more drives to your computer, such as a CD-ROM drive. Make sure you include this statement in your Config.sys file—excluding it can make added drives work improperly.

Adding Hardware

Your Config.sys file can also contain statements directly affecting hardware, something the Autoexec.bat file doesn't do very well. In Figure 2, we see another Config.sys file that has several statements added.

The "DEVICEHIGH=G:\DOS\MOUSE.SYS" statement tells DOS that there is a mouse that we want to run with Windows and DOS programs. The "DEVICEHIGH=" part of the statement tells DOS that we want to use any little-used segments of memory that can be found, saving our first 640KB of memory for other programs.

The "DEVICEHIGH=G:\MTM\MTMCDAI.SYS /D:MTMIDE01" statement tells the computer that a CD-ROM drive is connected to the computer. If you have a CD-ROM drive, your Config.sys drive might use a line a lot like this one, but it will not be identical because each make and model of CD-ROM drive is different.

The next line in our file tells the computer some things about the sound card installed in the PC. The "DEVICEHIGH=G:\PASTUDIO\MVSOUND.SYS /D:7 /Q:15 /J:1" statement tells the PC that the file managing our sound card (when using DOS programs) is in the drive/directory specified. The text to the right of the filename is all the settings for the sound card. Yours may vary with the make and model of the sound card installed in your PC.

If you have a SCSI hard drive in your PC, you'll see two statements in your file that look similar to these:

```
DEVICEHIGH=G:\DOS\ASPI2DOS.SYS
DEVICEHIGH=G:\DOS\ASPISCSI.SYS
```

These statements tell the PC that a SCSI drive is installed, and that it's a hard drive rather than another type of SCSI drive.

Save Your Changes

Once you've edited your startup files, you need to save your changes. Call up Editor's File Menu, select Save, then select Exit to close the Editor program.

Now it's time to try out your editing. Press the CTRL-ALT-DEL keys simultaneously to restart your PC. When you see the words, "Starting MS-DOS...", press the F8 key. DOS will let you to try out each statement in your startup files instead of running all statements unseen. When the statement that you edited is run, DOS will tell you if any problems arise. If a problem does exist, run Editor again, and make the necessary changes.

If a problem keeps your PC from completing the startup process, press CTRL-ALT-DEL again to reboot, then press F5 when the words "Starting MS-DOS..." appear. The F5 key lets you skip running the startup files altogether. Now you can run Editor to fix the problem, or you can copy your backup copy of the startup files to your hard drive to get your system up and running again.

Note that (in Figure 1) only the first two lines begin with the text "DEVICE=". You have to use "DEVICE=" on the memory management programs that appear early in the Config.sys file. All other programs that are loaded to support hardware (like a CD-ROM drive, SCSI hard drive, etc.) can include the "DEVICEHIGH=" text instead of "DEVICE=".

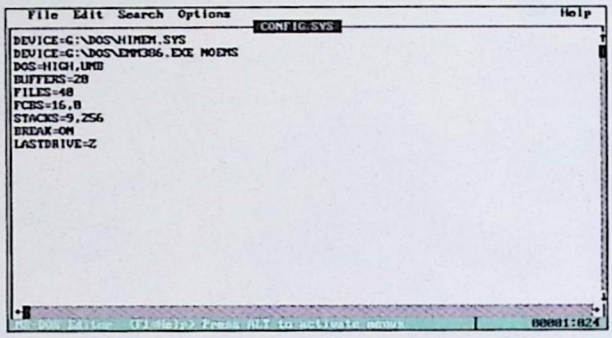


Figure 1: A sample Config.sys file that includes just a few statements.

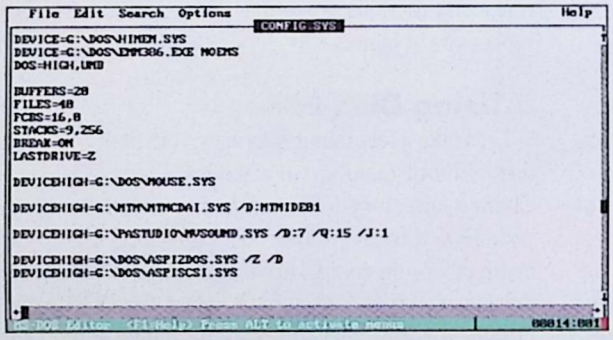


Figure 2: This screen shows how statements in Config.sys files can be organized by functional group: memory management, multimedia, SCSI, etc. (Blank lines are OK.)

More Tips

A few tips before you add to or edit your Config.sys file.

- Never make changes to your Config.sys file just to see the "effect" because you can cripple your computer. If you do make needed changes, store an "OK" copy of Config.sys and Autoexec.bat on a diskette for safekeeping.
- If you make multiple changes and an error occurs because of one of those changes, it can be a real nightmare to find and fix the problem. Have patience and try out *each change* before continuing onto other changes.
- Save a copy of your startup files in your DOS directory for safekeeping.
- Create a startup diskette just in case your PC will not start up using newly edited startup files. You can save yourself a lot of time and frustration by booting from a diskette, then copying the startup files from the bootable disk to your hard drive.
- Don't forget to update the startup files on bootable floppy diskettes after you make trouble-free changes to the startup files on your hard disk.

DOS does provide a handy (and free) Editor program that we used in these pages. Many other editor programs are available as well. You can even edit your startup files from within Windows. (To do this, run SysEdit from any menu offering the Run command, type **sysedit**, then press ENTER to use Windows' built-in editor program.) You can use Windows' Notepad or any other editor/word processor that will save a file in ASCII text format with a filename extension of .SYS.

At Your Own Pace . . .

Most people are a little nervous about making changes to files that can lead to potential problems if mistakes are made. One way to bolster your confidence is to work with your chosen text editor before you actually use it to edit startup files. Try composing a few letters, or just make some organized lists so you have the feel of the editor program before you do any serious work with it.

And so ends our series on editing system startup files. With a little practice and patience, you'll be doing your *own* troubleshooting in no time (instead of hiring someone else to do it), and maybe even become someone else's local DOS guru. ●

by Robert Mullen

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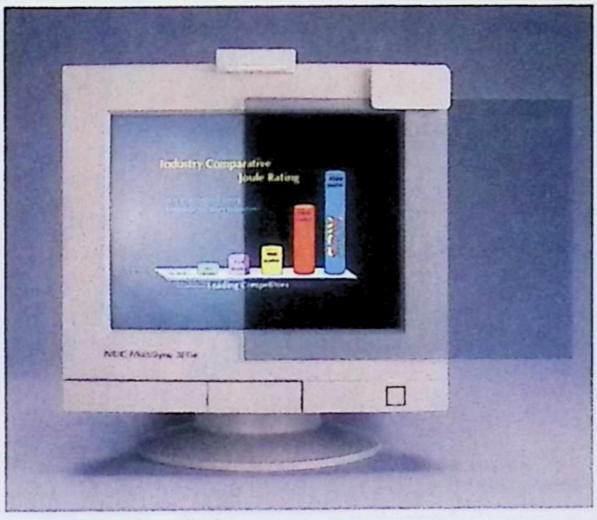

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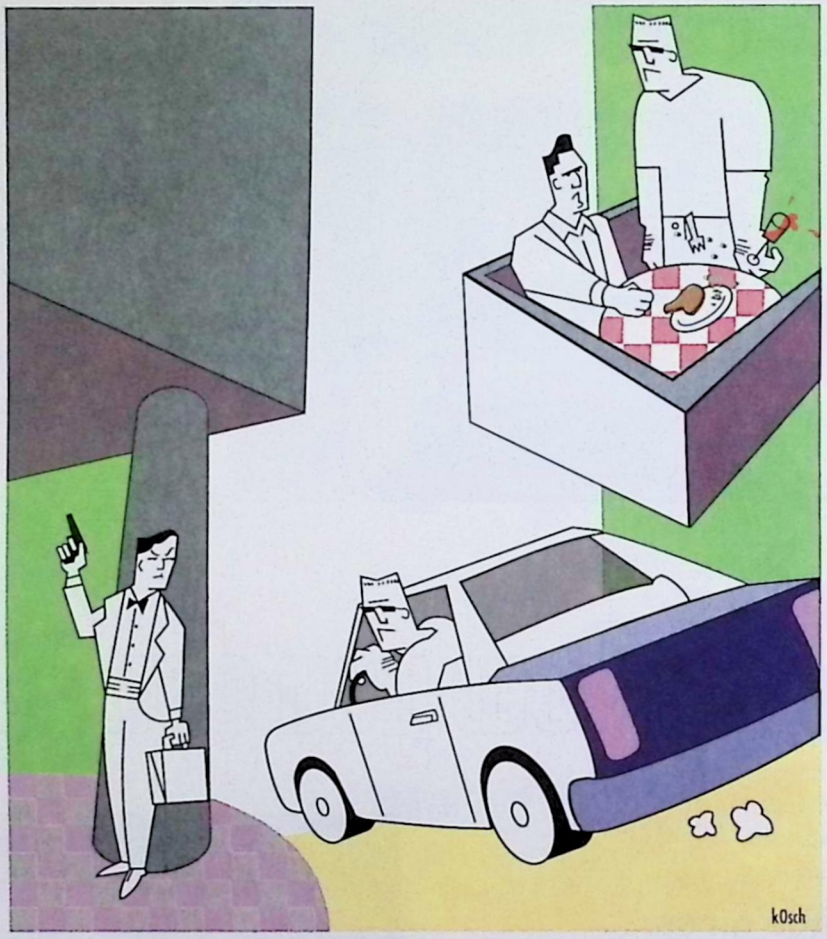
Safe Portable Computing

(No Secret Agent Equipment Required)

Easy question: What's the most valuable item you haul on a business trip? The answer: Your portable computer. After all, it easily carries the largest price tag. All of the peripherals needed to get the most out of your portable—an external CD-ROM drive, a cellular phone, and a full deck of PCMCIA cards—are costly, too. Finally, there's the one item for which you probably can't determine a price tag—your data. Depending on your type of business (and the date of your most recent backup), the value of your data may dwarf the physical cost of the portable computer.



Losing any component of this group would be a problem; losing the entire set would be devastating. These extremely valuable items usually reside together in the same case, making them convenient to carry, but also making them convenient for a thief to steal or for you to misplace or accidentally damage. In the rush and confusion associated with travel, keeping an eye on your computer equipment may seem of secondary importance in comparison to making that connecting flight, but it shouldn't be. Crashes (the physical kind rather than the system kind) can be deadly to your computer's components, so you'll need to avoid the jostles of the airport. What about those luggage x-ray devices? Do you need a lead-shielded carrying case?

Short of acquiring some James Bond-like equipment and handcuffing your computer case to your wrist, how can you protect your computer, components, and data from the dangers associated with travel? We'll show you a few precautions you can use to avoid danger. Following such guidelines will require some additional time, but you'd probably rather spend extra time at the airport during your trip instead of spending extra time after your trip in your boss' office explaining how your computer disappeared and how your customer files may be on their way into your competitor's database.

Road Hazards

While the idea of the airport's x-ray machine erasing data from your hard disk or from a diskette sounds believable, it's a myth. You're at far greater risk of losing data from a fumble-fingered security person who drops your machine while inspecting it by hand.

"You don't have to be concerned about [the x-ray machine] at all," says Mike Wagner, director of customer marketing in the computer systems division of Toshiba America Information Systems, a leading portable computer manufacturer. "It definitely has no impact whatsoever on hard disks or even on diskettes."

The x-ray machine can represent one of the most dangerous times for computer theft. If you place your bag on the x-ray's conveyor belt and then get stopped while going through the metal detector, a thief in a crowded airport could grab your computer from the end of the belt and quickly meld into the crowd. Ask security personnel to keep an eye on your bag while you're dealing with the metal detector.

If at all possible, your computer bag shouldn't *look* like a computer bag. If a thief has a choice between a regular piece of luggage and an obvious computer bag, the computer will disappear every time. Placing your computer bag inside a well-cushioned, larger carry-on bag is an option.

Wagner says most computer users keep a close eye on their computer while traveling, but they let their guard down once they reach their destination.

"Theft is most likely to occur within the office environment," he says. "People tend to watch their luggage and their briefcases a lot more closely than they do when the notebook is sitting out on a desk somewhere. We recommended that you use a security lock or a docking station with a lock."

Many people use foam padding, papers, or magazines in their computer bags to guard against minor jolts. Virtually no amount of padding is going to protect your computer during a major fall, though, Wagner says. To avoid dangerous bumps, always carry your computer onto the airplane, rather than checking it into baggage. If you've ever looked out the window of the plane while baggage is being loaded, you know why you need to carry the computer onto the plane.

"What you've got to remember about computer bags is that they're more to protect it against mild shocks and bumps," he says. "No matter how much foam padding you put around it, never check it as a piece of luggage. Most of the bags are reinforced enough to take the simple shocks. It's most important to get the padding on the edges, especially the corners. . . . Because of the weight distribution of the notebook, that's where it's going to fall."

Environmental Hazards

If your portable computer must be left inside a car, be sure to lock it in the trunk where it's out of sight. Temperature fluctuations are an issue when a computer is in a vehicle, but they aren't as dangerous for your computer as you might think.

"Notebooks can handle an incredible range of temperatures," Wagner says. "Realistically, it's about 45 to 110 degrees when operating. The real culprit for portable computers, and for any computers for that matter, is the humidity. . . . Humidity causes condensation inside the computer case, and water and electronics don't mix."

Some brands of portables are designed for use in harsh environments. Most portables, though, do their best work in temperatures and conditions that their users also find comfortable.

Other Dangers

Wagner says some of the most common damage to portable computers occurs with the liquid-crystal display (LCD). For example, accidentally leaving a pencil inside the case when closing it can cause the LCD to pop loose. If you carry your portable inside a briefcase, you can damage the display if the briefcase is too full and you must forcefully shut its lid.

"The LCD is the weakest part of the portable," Wagner says. "So never pack anything so tight that you're putting pressure on the unit itself. . . . If you're forcing the lid [on the briefcase], you're putting pressure down on the unit, and that tends to have an effect on the LCD. The [LCD's] crystal assembly itself is only 17mm thick, so it's very thin and very fragile."

The amount of jostling your portable computer can handle depends on the computer itself, Wagner says.

"That really is a question of the quality and ruggedness of the case," he says. "You really do get what you pay for in the portable computing world."

When it comes to taking a trip with your portable computer, there are plenty of dangers awaiting you: dropped computers and thieves are foremost among them. Preparation and allowing for additional travel time are a good start toward protecting your portable, but your best defense against problems on the road is common sense. ●

by Kyle Schurman

Traveling Tips

Traveling with your portable computer can require some unique precautions. Here are some additional tips for dealing with the odd situations you'll encounter.

Identification. Engraving your name and phone number on the computer is the best form of identification. If engraving isn't possible, you can edit your Autoexec.bat file and make the computer display your name each time it loads DOS. Type **edit autoexec.bat** at the DOS prompt and hit ENTER to gain access to the DOS Editor. At the end of the file, make a separate line and type:

```
@echo off
cls
echo.
echo This computer belongs to (your name).
echo Please call (your phone number) to return it.
echo.
pause
```

(The CLS command clears the screen. The ECHO command will cause whatever identification information you type to appear on the screen. The PAUSE command delays execution of the Autoexec.bat file until the ENTER key is hit.) Hit ALT-F followed by *S* to save your changes to Autoexec.bat. Then hit ALT-F followed by *X* to exit the DOS Editor. You must reboot your computer for the Autoexec.bat changes to take effect. If you're lucky, whoever finds your portable will see this message and return it. Don't include your address, though. If your computer is stolen, a thief would find your address to be handy information. If you're interested in protecting your data, security programs exist that require a password to gain access to the computer's files.

Backup. Making regular backup copies of your data is the most important aspect of traveling with a portable. If you perform regular backups and your computer is stolen, reloading programs and data is simply a hassle. Without backup copies, time spent re-creating data can be crippling to your business. To make backups, you can invest in data transfer software, save data to a PCMCIA hard drive or a removable hard drive (keep the backup hard drives separate from the portable), or E-mail data files to your company's network.

First-Aid Kit. A computer first-aid kit may help you get out of some minor jams. Items in the kit should include a system diskette you can use to boot the computer; a three- to two-prong electrical adapter; charged batteries; and important telephone numbers, such as for computer support or repair.

Flight Regulations. The Federal Aviation Administration generally prohibits use of portable computers and other electronic devices during takeoff and landing because of fears that the electronic emissions from the machines can cause interference with navigation equipment. Pilots have the authority to prohibit computer usage at any time during a flight. Cellular telephones cannot be used during any portion of the flight. If you're not sure about the policy concerning portable computer usage for a particular airline, ask flight crew personnel. ●

What's Hot & What's Not

Our Top 10 List Of Things In The Computer Industry That Get More Attention From The Press (Or The Public) Than They Really Deserve

Vanilla Ice is the best candidate for perpetual poster boy of the cause. "The Last Action Hero" walks away with the Oscar in this category. Brian Bosworth's NFL career is a slap-in-the-face example of the phrases brought to life.

All glitz and no delivery. Overhyped and underqualified. Rottweiler barks and teacup poodle bites.

In any area there are inevitably personalities, events, and products that assault the public with propaganda extolling their greatness. But behind the flashy ad campaigns and fawning media commentators, we find people and products that are really no better, and sometimes worse, than everything that's come before them.

The personal computer world is, of course, no different. For every Macintosh that is touted as a revolutionary product and actually changes the way we work, there are dozens of electronic flameouts that see their greatest glory in media blustering. Real-life users, sometimes afraid to speak against what seems like prevailing opinion, quietly tell their friends that the latest release isn't that great. That they wish they'd waited to buy something else. That the full-page color ads are misleading.

To offset the overwhelming hoopla, we've looked into what are currently some of the most-hyped products, categories, and trends in the PC community. Few of the items mentioned here are hopelessly faulty products. Most, on the other hand, are simply ideas that are pitched as reliable solutions before all the bugs are worked out. They've been declared fine before their time.

If you're looking for a little more insight than taglines and soundbites can offer, join us in our jump off the bandwagon to find what's hot... but really not.

Microsoft's Windows 95

After putting a chokehold on operating system market share with its Windows interface, Microsoft dangled a carrot before anxious users for months last year with the anticipated release of Windows NT. The release date was repeatedly pushed back until the latest announcements drew scornful laughs. When NT finally hit the market it was somewhat disappointing because of the stiff system requirements needed to run the operating system.

With the next release of Windows now dominating trade publications and industry conversations, many people are wondering if another NT-like fiasco is at hand. The new version is a 32-bit operating system (OS) complete with the familiar Windows graphical user interface (GUI) and features like true multitasking (full-speed, simultaneous operation of two programs).

The latest release goes by three monikers: Windows 95, Windows 4.0, and Chicago. In the official product name, Windows 95, Microsoft abandoned the numbering method of naming Windows versions. The reported thinking behind this was that the company wanted to appeal to less technical, non-power users who could identify with a plain-English name marked by a year. The ploy is a bit baffling since users who can't or won't decipher version numbers probably aren't awaiting an OS with system demands as hefty as Windows 95's. The new Windows will likely require 8MB of random-access memory (RAM) and a Pentium microprocessor to run effectively. Users who need a watered-down product title are unlikely to own or install such hardware on their PCs. Further, Windows 95 users will need to upgrade their current 16-bit applications to 32-bit Chicago versions to take full advantage of the new OS; that could cost from $100 to $200 per application. For many average users, Windows 95 probably won't offer enough innovations to justify the steep price tag.

Even those willing to ante up for the latest Windows should use caution and may want to sit out of the buying craze for a few months. Windows 95, like most major new versions, is

likely to have some rough edges when first released.

And when is that release likely to come? Pulling another NT, Microsoft has repeatedly bumped back the date. While the computer media eagerly waits at Microsoft's doorstep, the latest release date as we went to press was for May or June. Saddled with heavy hardware and software upgrade requirements, questions about bugs to be worked out, and annoying delays, Windows 95 is showing a decidedly cold posterior behind its hot image.

PDAs and Handwriting Recognition

Take a moment to compare your handwriting with that of a few people around you, and you'll quickly spot the nemesis of personal digital assistants (PDAs). Notice how different your letters are from a friend's or even from the way you wrote the same letters yesterday. A stray loop on a *y* can doom the handwriting recognition software on which PDAs stake much of their usefulness.

PDAs have been touted as the greatest mobile information innovation since the DayTimer. The handheld devices accept schedules, address books, notes, and even simple drawings. On the output side, they offer features such as language and measurement conversion tables and lists of U.S. area codes. Ads and demonstration videos show business users merrily jotting down contact names and meeting notes with stylus pressed against touch-sensitive screens. The ad campaigns portray PDAs as the paper planner's ingenious descendants, combining the ease of handwritten input with the advantage of computerized organization.

But a funny thing happened on the way to market domination. PDA users glibly went to write "accept" in a note and the device read it as "upset." With a raised eyebrow, the users rewrote the entry. This time the PDA saw it as "acceyst." Meticulously this time, the users wrote "accept" in their best grade-school penmanship and the accursed machine read "access." The PDA went back in the briefcase and the paper planner came out. Too bad the manuscript mishap cost the disgruntled owner about $700 to experiment with a PDA.

PDAs won't appear in every briefcase and suit pocket until handwriting recognition becomes 100% reliable. Ninety-five percent accuracy may sound impressive on paper, but in practice it is unacceptably faulty. PDAs have found the most acceptance thus far in narrowly defined, repetitive situations such as warehouse inventory where workers tap icons and numbers to enter data for certain products. There's still hope for general-purpose PDAs, but media coverage has created overly ambitious expectations for them.

Speech recognition systems often produce undesired results.

PDA manufacturers have learned that, for the most part, users haven't been fooled

enough by big claims to buy what are essentially expensive prototypes. Apple recently recognized that the original marketing approach for its Newton MessagePad was poorly targeted. Instead of selling the Newton as a consumer electronics device, Apple is now targeting it at large organizations. Several months ago, Compaq dropped plans for a much-talked-about Mobile Companion.

The latest great hope for handwriting recognition is Palm Computing's Graffiti utility. Analysts have hailed the software as the best handwriting program yet, and Palm Computing promises 100% recognition. Graffiti works by forcing users to simplify their writing through the use of single strokes like < for *K*. Even if Graffiti lives up to expectations, one still wonders how long it will be before PDAs flawlessly recognize real English writing.

Speech Recognition

Speech recognition hype is based on advantages similar to those supposedly offered by handwriting recognition. Both plan to take basic modes of human communication—speech and writing—and make them tools for computer input. But like handwriting recognition, speech programs still offer only promises for the future accompanied by unreliable technology.

Speech recognition, in theory, provides a hands-free means of navigating programs and manipulating data. The advantages of such a system are obvious for the disabled, those who can't type, and those who can simply be more productive if their hands are available for tasks besides keyboarding. The reality of speaking to a PC in 1995, however, is different from the rapid verbal navigation we're led to expect.

Most speech recognition programs must be trained to recognize the user's voice. Fair enough. Most of us can live with a one-hour training session if it means our computer will know its master's voice as well as any RCA dog. But the training doesn't ensure perfect recognition. Phrases like "switch to" and "go to" are often misinterpreted and produce undesired results. Slamming an armchair against the desk might be taken as "close" and shut down an application. These factors make the reality of speech recognition more trouble than it's worth. Few users are willing to carefully enunciate commands and avoid misleading sounds like setting coffee cups or folders on the desktop. This catering to a speech recognition microphone is hard enough at the beginning of a calm day. Try it when you're speaking in a hurry or have a nasty cold.

The good news is that many experts believe speech recognition will understand words at conversational speeds in a couple of years without requiring unreasonable system resources. We may eventually have Star Trek-like conversations with PCs, but for the moment the technology is mostly just talk.

Screen Savers

Remember the last time you used a monochrome monitor? There's a good chance its plain black or green face was scarred with the faint imprint of text that stayed on the screen too long and burned its image there forever. But wait, you say, you never see these burned-in monochrome dinosaurs anymore. Everyone has color monitors, and those are always free from ghosts of programs past. Precisely.

The official line on screen savers is that they prevent monitor burn-in with moving graphics. This was a great selling point before moni-

tors were designed to resist burn-in. Even paranoid types who still worry that images will overstay their welcome don't need to buy a screen saver because there are several built into Windows.

Despite their outdated functionality, screen savers continue to sell, mainly because they surpass the plain shapes of the Windows screen savers to provide PC entertainment. No matter what their interests, users can find a screen saver to fit their tastes. Themes include everything from Star Wars to Clinton-bashing to classical art. Many buyers would rather see Bill the Cat swim across their idle screen than watch text.

Of course, screen savers don't come for free, especially in terms of system resources. They consume memory, and performance-minded users may notice a drop in application performance. Occasionally screen savers can cause memory conflicts that can lock up a system. While the graphics can be great fun to watch, they can also be a disruption in the workplace, and it's unlikely business users will leave the sound on for long. Despite all these drawbacks, screen savers are still amazingly popular.

Business Card Scanners

It seems like such a great idea. Instead of returning from a convention with a stack of business cards and dreading the data-entry job ahead, business people can smile. They can run the cards through a scanner and let software enter all the information in the correct fields. No more laborious typing, right?

If only it were so simple. Buyers who took a chance on business card scanners are probably nodding to themselves right now, knowing that it seemed too good to be true. The products' weak link is the optical character recognition (OCR) software, which is crippled by the variety of designs, colors, and typestyles of business cards. If the company name is written in a decorative way, the software is likely to misread it. If text is italicized, the software is likely to misread it. If there is light type on a light background . . . you get the idea.

The programs usually offer an edit mode in which users review the recorded data and correct any mistakes. Unfortunately, there are enough mistakes to make editing seem a lot like retyping *all* the data on the card. Even when the OCR is accurate, users have become skeptical enough that they still check the information. We choose to enter business card information the old fashioned way—we type it.

Music CDs On The PC

It seems computers should stay out of some areas of life, and we're not talking about privacy concerns here. The latest aspect of personal life for PCs to avoid is that of music CDs. Much of the popular discussion these days would have us sliding Garth Brooks or Whitney Houston into the CD-ROM drive and sitting back to savor the tunes. But there are a few sour notes in the plan.

The obvious problem is sound quality. When headphones are plugged into the PC's CD-ROM drive or sound card, the sound equals that of any stereo. But when computer speakers are attached to the PC, sound quality may quickly drop off. Costly PC speakers can produce stereo-like reproduction, but less expensive speakers often produce a hollow, scratchy sound.

Portability is another concern. If a CD-ROM drive is the only CD player in the house, the CDs are tied to the desktop as much as the PC. Such a situation is a bit unbelievable to start

TALK ABOUT HOT

A few things in the computer industry are so hot they sizzle—and righteously so. Take a look at some of the hottest below.

Fiber Optics—You can't move massive amounts of information from one place to another without enough carrying capacity. While companies continue to squeeze more data onto traditional phone lines or coaxial cable, the ultimate mode of transportation—now and in the future—is still fiber optic. Unfortunately, the high cost of laying fiber optic cable from trunk lines to individual homes means that the introduction of a nationwide all-fiber transportation system will be delayed.

PCMCIA—One of the thorniest abbreviations in the computer industry, Personal Computer Memory Card Industry Association cards are nevertheless state-of-the-art when it comes to adding powerful components in a minimal amount of space. What we don't understand is why more desktop systems don't take advantage of the technology.

CD-ROM—Able to hold more data than over 400 high-density diskettes, CD-ROM disks have helped move multimedia into the mainstream. CD-ROM drives are on the verge of becoming standard equipment for computer systems, as the CD-ROM format is already de rigueur for video- or audio-intensive applications.

Educational Software—First there were the encyclopedias. Now you can find programs covering everything from ancient history to modern music. Entertaining as well as educational, the new thrust in children's software will appeal to moms and dads as well as the kids.

Color Printers—Splash on some color and you can liven up any report. Printer manufacturers have made dramatic strides in improving the quality of color printers, and at the same time have managed to make them more affordable. Companies and individuals are now buying the printers in droves.

Ergonomics—Manufacturers are replacing the uninspired, copycat look of most PC components with sensible, functional designs. After years of having to play "Where's the on switch?" and suffering physical discomfort using PCs, consumers are being offered a choice of fashionable peripherals and systems. Finally, keyboards and mice that don't cramp your hands.

E-Mail—Forget shopping in electronic malls and downloading electronic magazines. What people really want to do when they go online is send messages. The use of E-mail is soaring, and is one of the main reasons people want access to the so-called information superhighway.

Office Suites—Why buy individual programs when a single package that contains them all is available at a reduced price? Software companies underestimated the market when they introduced the idea of "suites" a couple of years ago. Now the all-in-one products have become leading profit makers for manufacturers. ●

with. How many consumers lay down around $2,000 for a PC and then scrimp and save for a stereo? The process is usually reversed.

Even for someone who only wants to listen to CDs with headphones at the desk (which is rare), music CDs present problems. Listening to music CDs means no CD-ROM programs. Several sound cards include DOS CD utilities that cannot run in Windows and thus are the only program that can run on the PC. If you receive a phone call or another interruption, it's easier to punch the pause button on a CD player than to grab a mouse, minimize the active program, open the Windows CD utility, and press pause.

One of the latest ideas in this area comes from Advanced Digital Systems (ADS), which sells a $250 board that lets PCs receive FM-radio signals. It also can receive the stations' weather, traffic, and music information, displaying the data across the computer monitor. Sounds good, except the board can only receive signals from stations using the Radio Broadcast Data System (RBDS). The nation has 4,785 FM stations, according to the 1992 "Statistical Abstract of the United States," but only about 400 use the RBDS standard, according to ADS.

Interactive Movie Games

This category tenuously remains in the "not" category. It's actually on the verge of fulfilling its hype. These games typically combine realistic graphics, filmed images of actual actors, and detailed story lines to draw players into a distant world like Victorian England or an abandoned space station. The premise is that player actions determine the course of the game. The problem is that the games aren't always as interactive as reputed. As a character, you may enter a room and see three doors, any of which you may enter. The next few screens will depend on which door you choose. But aside from the doors, the rest of the room may not be truly interactive. Cabinet doors, books on shelves, and dark corners may interest a player, but most games allow interaction only with the doors.

Interactive movie games often sacrifice substance for style. Manufacturers know that impressive backdrops and smooth-talking actors will entice many buyers to take the program home. Once into the action, however, serious players often find themselves disillusioned with the game's plot. Options are frequently somewhat limited and obvious. It may be possible to master the game within a week, after which the software package becomes a decorative bookend.

But the apparent salvation of interactive movies is at hand. Recent products in the category continue the trend of astonishing graphics and film, but also include the advantages of true interactivity and intriguing plot lines. We tried Access Software's *Under A Killing Moon* and couldn't keep from telling everyone we saw about the experience. Everything in a room is fair game for inspection, including books, doors, windows, and photographs. Players can crawl under desks if the mood strikes. A variety of replies are available whenever the main character meets others. The involved plot requires patience, reasoning, and good detective work. Other promising games include Origin Systems' *Wing Commander III* and *King's Quest VII* fro Sierra Online.

AND WHEN YOU'RE NOT, YOU'RE NOT

On the flip side of hot is this handful of items. Brrrrrrrr . . . better get a blanket before reading.

Voice Mail—Voice mail may well reign supreme as the most universally disliked but ubiquitous technology on the planet. Who hasn't cringed upon hearing a monotone voice recite "Press 1 for Sales, 2 for Customer Service," etc., etc. ad nauseum? And who hasn't hung up in frustration after being forced to wade through 10 minutes of "dial down" lists, only to discover that the wrong button was pushed or that no human contact is forthcoming on the other end of the line? While it may have some positive benefits when properly used, the majority of "Voice Jail" systems deserve to be trashed.

Videoconferencing—It sounds great: See as well as hear the person you're conversing with over the phone. Trouble is, who wants to pay an arm or a leg for it? Consumers certainly don't, and most businesses are hard pressed to justify spending any money on a videoconferencing setup. "Say, Harry, love that suit you're wearing. OK, here's our proposal. . . ." Impressive-looking, yes, but practical, no. Maybe someday, after the world has moved onto fiber optic cable, it will make more sense.

Dot Matrix Printers—Laser printers under $500 and color inkjets for less than that are putting the big crunch on dot matrix printers. Sure, there's still a place for dot matrix. But why should Jane Consumer want one when she can spend an extra $100 and get inkjet quality? The old "brrrrrrpppippippipp" of dot matrix pins striking paper is disappearing.

Green Computing—Enough with the hype. Here's one politically correct marketing technique that was overplayed from the start. Sure, everybody wants to help the environment (at PCN we use soy ink and recycled paper), but how many consumers or corporate users of computers are willing to pay, say, an extra $500—or more—for a computer that cuts energy consumption by a dozen watts an hour? Not too many, at least from what retailers are indicating. Ask how many PC users would be willing to trade a couple megabytes of RAM or hard disk space to save watts and you'll get the picture.

Pizza Hut On The Internet—This marketing concept demonstrates what you can do with enough technology and time to waste. It's now possible to order your pepperoni over the Internet. Is anyone really so desperately busy with their PC that they can't tear themselves away to use a phone? No, that's too easy. Instead, let's burn up some bandwidth and get pies delivered via the SuperHighway. Next thing you know we'll be seeing golden arches at every on-ramp. . . . ●

Plug And Play

Only the masochists among us live for the thrill of installing computer boards and peripherals. Most of the PC public wants to skip past headaches such as configuration and IRQ settings and get straight to using the new hardware. Hassle-free installation was just a dream in the past, and, despite the promise of a new standard, it will remain so for awhile.

Industry heavy hitters, including Intel, Compaq, and Microsoft, joined forces last year to create a new standard known as Plug and Play. PCs built to the Plug-and-Play standard recognize new Plug-and-Play add-on boards and automatically configure them for optimum performance. Similarly, Plug-and-Play machines effortlessly adapt to changing peripherals such as printers and network cards. Once again, it seems like a good idea that isn't quite there yet.

Current operating systems and 16-bit applications aren't written to configure Plug-and-Play boards. They may misassign system resources or produce more error messages than seamless integrations. Microsoft's Windows 95 will reportedly outline for its Plug-and-Play capabilities. Most current computers lack a Plug-and-Play BIOS (basic input/output system). New machines are Plug-and-Play compatible, but here again we run into the problem of buying a new PC, operating system, and applications to tap into the latest trend.

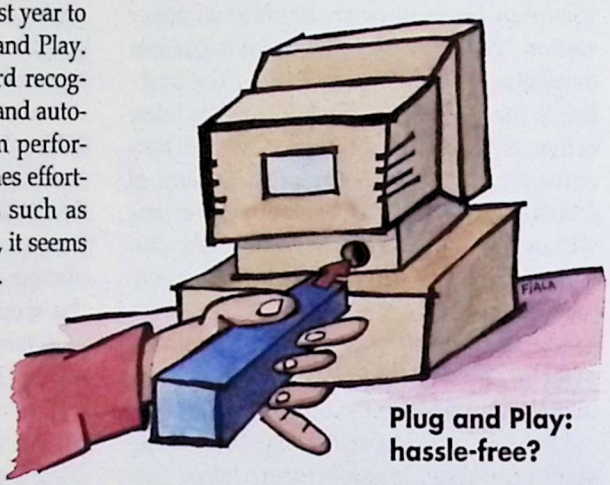
Don't forget "legacy" boards, those boards left over from the pre-Plug-and-Play days. Even Plug-and-Play systems require users to enter the requirements of these older boards. The days of Lego-like PCs haven't quite arrived. We can't simply snap on bigger and better hardware and immediately get to work. The new standard may be on the way, but until Plug-and-Play components and software are more common, keep the Anacin handy during installation.

Virtual Reality

In a situation similar to that of speech recognition, an enthusiastic press and imaginations spurred by movies have created unrealistic expectations for virtual reality (VR). Nothing like the Starship Enterprise's Holodeck exists yet despite what we all may want to believe. VR has been hyped on promises of things to come, while the current reality—no pun intended—is considerably less glamorous.

Even the best VR available lacks the fully inclusive experience some expect. VR has found the most success in highly specific, narrowly focused applications like training medical students with virtual surgery.

VR entertainment is saddled with the highest expectations. Thousands of people flock to VR arcades to savor games that provide rich entertainment, but in a limited environment. At Virtual World Entertainment centers, players



Plug and Play: hassle-free?

climb into cockpits and do battle in simulated robots. Other setups put gamers in a ringed pedestal where they shoot at bad guys seen through head-mounted displays (HMDs), or hang in a gian gyroscope and feel virtual flight. These games satisfy most customers, but they admittedly have limitations like wearing a heavy helmet, staying in a cockpit, or requiring capital investments in the tens of thousands of dollars.

Take the growing number of VR products for home use with the proverbial grain of salt. Manufacturers often stick the hot VR label on anything that provides a remotely immersive environment. One three-dimensional design program claimed to provide VR walkthroughs of home blueprints, when in fact it was simply a jerky 3-D rendition of the plans at eye-level.

HMDs, usually costing around $700 to $1,000, are available for making home PC games more intense. The product's value usually doesn't justify the price tag. The HMDs typically use small LCD screens directly in front of the user's eyes. To keep the price from getting laughable, manufacturers sacrifice resolution, resulting in fuzzy images. Tracking (where the line of sight follows your movements) is often questionable. The software may need a second or so to adjust the image when players turn their heads. Furthermore, many users suffer headaches or severe dizziness when trying to focus on tiny, moving images less than an inch from the eye. One of our editors who has tried a number of home HMDs at trade shows says he wouldn't pay $100 for most models. VR technology will improve quickly, but for now the best VR you can get at home is on Star Trek.

The Internet

Finally we tackle the seemingly omnipresent Internet. Everywhere we turn, someone is expounding on the vast information resources available on this worldwide network. We hear figures stating that upwards of 20 or 30 million users are logged on and keeping in touch. Bookstore shelves bow from the weight of volumes offering tips on Internet use.

However, *New York Times* computer columnist Peter H. Lewis recently wrote that there may be only three million people actually using the Internet. There could easily be 20 or 30 million people with *access* to the Internet, but the number of real users is substantially lower. Furthermore, says computer author Rosalind Resnick, the majority of those on the Internet are employees of the government or universities. This spells trouble for those who go online hoping to get rich quick with chain letters or promotional E-mails. An audience of educators and bureaucrats doesn't work well as an online consumer goldmine. Get-rich-quick E-mail schemes are likely to draw the wrath of most Internet users anyway.

Once users merge onto the information superhighway (itself an overused and underdefined term) via the Internet, the data they need isn't always at the next exit. The Internet itself has no centralized directory or search features to guide newcomers. Some Internet packages and commercial online services, however, do provide these services. When problems arise with the Internet, there's no 800 number to call for tech support. It's a matter of self-preservation for perplexed users. The Internet also lacks a message-confirmation feature so users may never know if an E-mail message fails to reach its destination.

The Internet gets the press and the forefront of many conversations, but its inflated user numbers, esoteric organization, and lack of user support show another side. Too bad for the Internet, but it makes our list. On the surface it's hot, but when it comes to real-life use, it's not. ●

by Trevor Meers

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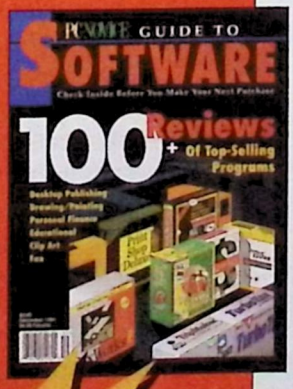

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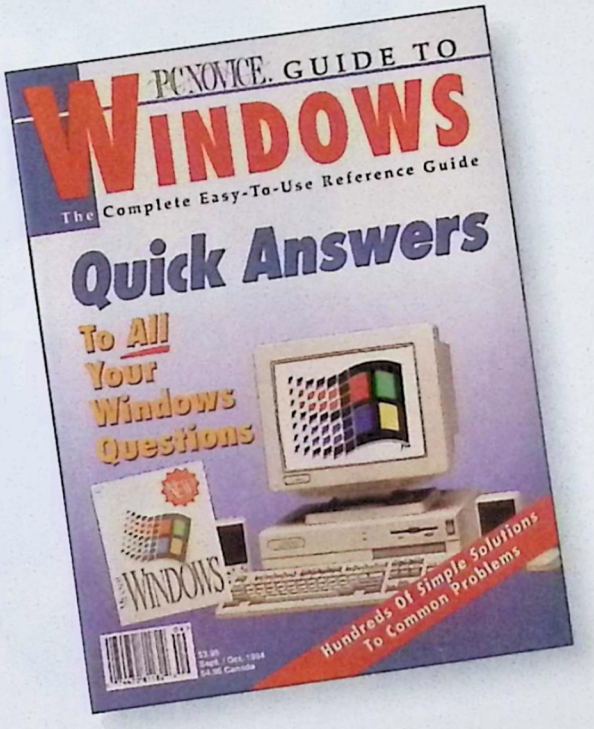

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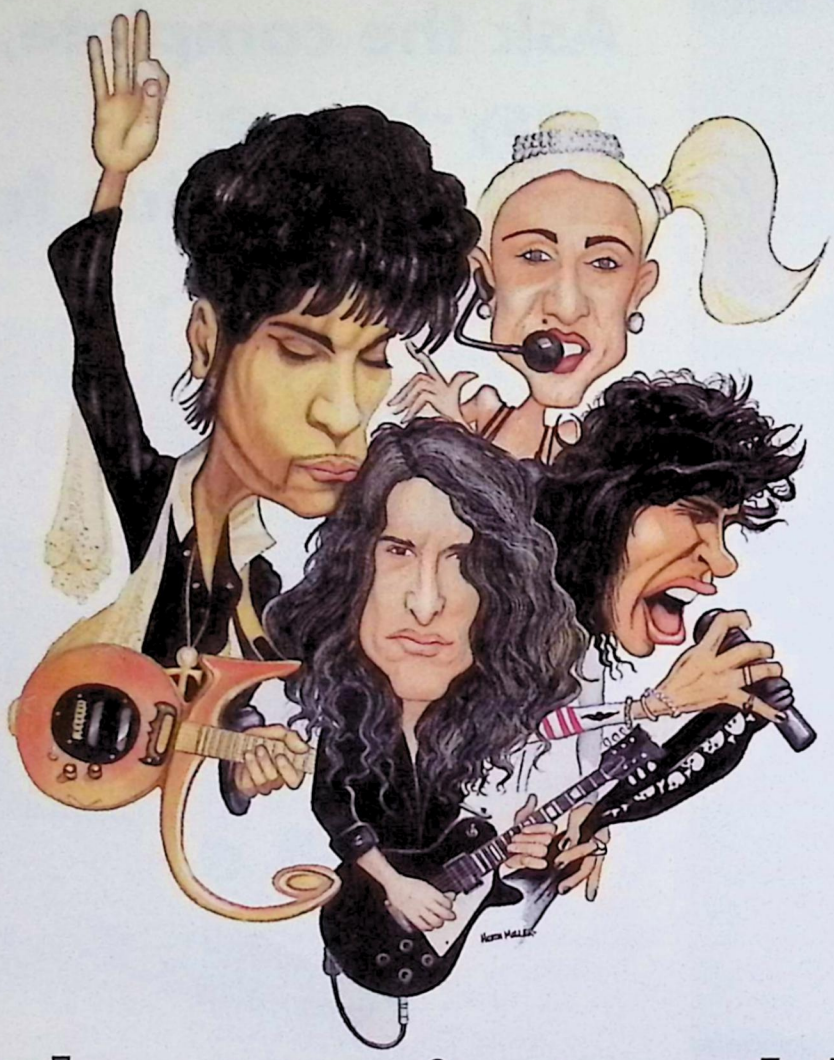


The Music World Goes Online

Imagine you're curled up at home late one night and suddenly feel an overwhelming urge to hear the latest Joshua Redman disc.

Nearby record stores closed hours ago, but that's no problem. Instead, you head over to your computer and use its modem to dial into a special database holding thousands of musical titles. With the flick of a few buttons, you can sample tracks from each album or see pictures from the recording sessions.

When you find the record in question, another button flick downloads the entire album through the telephone line into your computer and, eventually, a recordable compact disc player—complete with graphics of the cover suitable for reprinting on your laser printer.

Sound like something from the latest "Star Trek" movie or one of AT&T's "You Will" commercials? Not to former MTV "VJ" Adam Curry—a self-confessed cyberspace fanatic who began operating his own online music service from a New Jersey suburb in early 1993.

"This stuff is one to three years away," says Curry, who left his job on the music channel last April to run his own online computer service companies, On Ramp Inc. and Metaverse.com, full-time. "It may sound fantastic, but if you had said 10 years ago that vinyl wouldn't be in record stores anymore, you would have been laughed out of the room."

In fact, the online world already offers music fans a host of options for filling their sonic appetites, from downloadable versions of songs, radio broadcasts, and video clips to live chat conferences with your favorite recording artists and multimedia presentations that tie it all together in one impressive package.

Never ones to miss a trend—especially one that could affect how millions of people find their music—record industry types have jumped into cyberspace with a vengeance, prompting an explosion of music-related online services. Record companies large and small have begun staking out areas (or "domains") in cyberspace, and bands ranging from Phish to Megadeth to Machines of Loving Grace have created their own special rest stops on the information superhighway for computer-jockeying fans.

"The online services have become an alternative media, not unlike MTV and some other

channels," says James Griffin, director of information technology for the David Geffen Co. record label. "It's an important step in letting consumers choose what they want when they want it."

In June, Geffen became the first major-label record company to distribute an entire song by a million-selling artist through cyberspace by offering a new Aerosmith tune, "Head First," to CompuServe users for free downloading over several weeks.

Though it took 30-60 minutes for most computers to complete the transfer—with usage fees suspended for this unique experiment—fans of the band now own a rare musical moment (the song is also available as an import on the flip side of "Eat The Rich"), and the company has a rough gauge of online consumer interest.

"The technology was the least of our problems," says Griffin of the offer, which eventually attracted about 8,000 downloads. "Convincing a band to part with a song for no royalties and convincing CompuServe to waive the download time—that was the challenge. But we found a broad swath of people taking part . . . all kinds of fans wanted to be in on this."

Right now, the only limitation seems to be the level of technology available to most users; depending on how the song's data is digitized and the speed of an individual's modem, downloading sound files can take two to five times as long as the actual playing time. (For example, downloading a 33-second, 8-bit sample of the Madonna single "Secret" from America Online at 9600 baud took about 15 minutes.) And recordable CD and CD-ROM players have price tags in the thousands of dollars.

But there's still a host of services available for those hoping to explore the world of music in cyberspace: those on large, national networks like Prodigy, America Online, and CompuServe; smaller, localized bulletin board systems; and areas available only through the Internet.

The Big Guns

Ask how online services have affected his job, and Jeff Gold will tell you about the time he went "cybersurfing" through his company's then-newly established forum on America Online in late 1993.

There the Warner Bros. Records vice president found over 100 messages hotly debating why Warner subsidiary Reprise had never released compact disc versions of six old Neil Young albums. "Isn't our money green enough?" wrote one exasperated user.

"On CompuServe you get an older audience . . . they tend to log on, get their information, and log off, whereas [America Online] is fairly young . . . they talk amongst themselves and make friends."

— Todd Steinman, system operator Warner Bros.

By coincidence, Gold was meeting with Young's manager the next day. Though the release was delayed so a newly developed digital remastering process could be used, the wheels were set in motion for CD reissues of Young's old Reprise albums—mainly because the fans wanted them.

"After that, I saw messages like, 'All hail The Bottle Man,' " laughs Gold, referring to his on-screen alias. "It must be great for fans to have that experience . . . direct input with the record company or artist."

America Online is one of several nationwide networks offering its own music-related services to customers along with special areas established by companies like MTV and Geffen. Typically, those services include album and concert reviews, downloadable pictures and sound samples, and bulletin board-style message centers where you can read and post information or opinions.

"Hello all you cyberheads," begins a sultry-sounding message available for downloading by the diva of dance herself, Madonna. "Welcome to the '90s version of intimacy. You can hear me, you can even see me, but you can't touch me." Thanks to another downloadable snippet, fans were able to check out a half-minute of "Secret" weeks before the album hit the stores.

"This information is faster than any news story . . . just tap it in and it goes right out," says Todd Steinman, system operator (or "sysop") for online services maintained by Madonna's parent label, Warner Bros., on America Online and CompuServe

"On CompuServe you get an older audience . . . they tend to log on, get their information, and log off, whereas [America Online] is fairly young . . . they talk amongst themselves and make friends," he continues. "There's an ongoing [E-mail conversation] about an album of Elvis Costello cover songs. People are talking about who should and shouldn't be on it, but it's all in their heads."

Besides maintaining the systems, Steinman often acts as an online resource, answering questions about upcoming releases, concert tours, past projects, or artist biographical information. "I usually just monitor discussions and correct mistakes. But a lot of people ask if I can get tickets to shows. One even asked me for George Harrison's home phone number . . . which I didn't have."

And then there are fans like Debbie Smith, who has reached out to CompuServe's sprawling, 2-million-plus membership by creating a cozy corner of cyberspace devoted to her favorite recording artist, soap-star-turned-rocker Rick Springfield.

Through an account at her New Jersey home, Smith runs her own informal fan club, posting a newsletter three times a year, as well as filmographies, discographies, and touring information on her idol, the baby-faced author of such '80s hits as "Jessie's Girl" and "Don't Talk to Strangers."

Outsmarting Bootleggers

As the music biz flies into cyberspace at light speed, there's still one unanswered question: How do you make sure artists get paid for their work?

In a conventional setting, record companies pay artist royalties by tabulating how many units are sold at retail stores. But when dealing with digital information, one downloaded file can be instantaneously transmitted to a thousand fans. So how do you curb the temptation to sell unauthorized copies (or "bootlegs") of albums and singles?

So far, the limitations of consumer-level modems have not allowed for widespread transmission of entire albums online. But record company executives and artists know that day is just around the corner, and they're already preparing for the battle.

Executives at Warner Bros. records decided to establish their online presence after seeing numerous bulletin board postings discussing a Depeche Mode album that hadn't been released yet. "It was obvious they'd heard it," says Jeff Gold, a vice president at Warner Bros. "We decided to turn that to our advantage."

At the Brooklyn, N.Y., offices of GrayZone business management company, 12 "cyberpunk operatives" comb the national networks, smaller bulletin board systems, and the Internet for evidence of bootlegging activity—usually electronic "ads" describing the merchandise, possibly providing a sound sample for downloading and offering information on how to purchase a full CD or cassette.

"People think it's just a bunch of fat, old hippies making copies of stuff for each other," says Dorothy Sherman, GrayZone president. "But when we seized the records of an Italian bootlegger, we saw that he filed for $5 million in sales for one quarter. And a company in the United Kingdom made $500 million in a year."

According to Sherman, progressive, forward-looking artists—like Prince, Madonna, Nine Inch Nails, and Depeche Mode—are usually prime targets for such activity.

Hoping to cut off the bootleggers' access to cyberspace, companies like GrayZone have been legally pursuing damages from service providers that, knowingly or unknowingly, disseminate solicitations from bootleggers through their systems, including large national networks and university research labs.

"There are whole bulletin board services, about 16 of them, that do nothing but sell bootlegs," Sherman says. "We're working on a program that will automatically search through all the gophers all the time and flag areas with certain keywords. We're very persistent."

Good thing, too, because some cyber-bootleggers have fought back by hacking into Sherman's telephone lines, E-mail services, bank accounts, and credit card services. "If they want to get you, they don't shoot you in the head . . . they come after you with their computers," she says.

On the Phish.Net, an Internet-accessible forum dedicated to the rock band Phish, devoted fans often act as their own police force, discouraging those who try to sell bootlegged merchandise online, according to co-sysop Shelly Culbertson.

"Phish fans are very aware of the difference between trading tapes and selling them," she says. "They get outraged when they see people profiting from the band's work without giving them their due."

Still, Culbertson sees the possibility for abuse. "When you have mass distribution of digital information, it's a prime situation for bootlegging . . . It does make me nervous. I wonder about the tremendous growth that's taken place and people who don't understand the delicate, understated agreements that have operated in cyberspace."

Former MTV "VJ" Adam Curry, still smarting from legal tussels with his former employer over the original name of his own Internet-based music forum, MTV.com—now renamed Metaverse.com—doubts much can be done.

"I don't think there is a solution," he says. "Illegal software is a $7-billion-a-year business that they can't stop, either. Colleges already have access to high-speed modems and people are sending Pink Floyd's new album across the country with a couple of keystrokes. Will this stuff make record companies obsolete? The answer is yes."

But Sherman disagrees. "People think it's uncontrollable, but you can't sell bootlegs unless you advertise. So, sooner or later, you're going to hear about it, somewhere." ●

So far, she's only found about nine other people who share her unique obsession, but she's hopeful her postings, available in the service's Recording Industry forum libraries, will attract a larger crowd eventually.

"I like the fact that you can get an almost immediate response," says Smith, who flew to Seattle the day after Mother's Day upon hearing of a Springfield concert there. "You put something out in the morning and you might get a response in two or three hours. Some people are snide—they say, 'Isn't he dead?'—but it's great to find out things before they're printed anywhere else."

A Smaller Focus

For those whose tastes run to the more eclectic, there's also localized bulletin board systems, which are bite-sized versions of the larger networks, that tend to focus on smaller, more cutting-edge groups.

Operators of the New York-area SonicNet bulletin board, dedicated to so-called "alternative" bands and culture, amazed attendees at the 1994 New Music Seminar in New York City when it showed off some of its services, including song samples from groups like Halcion, Giant Sand, and Idaho; real-time coverage of events at New York clubs like the Thread Waxing Space and Wetlands (including photos); and areas for filling ticket and merchandise orders.

Despite its impressive debut, organizers hit plenty of roadblocks service-wise in trying to deliver on early promises. Still, with a membership list that includes *New York Times* music critic Jon Pareles and *Playboy* music contributor David Marsh, the service is hoping to become the cyberspace equivalent of cutting-edge New York clubs like CBGB's or the Knitting Factory—a hip, music-oriented online gathering accessible to all for $10 monthly.

"People in the alternative rock scene get very obsessive of the bands they're fans of," says Tim Nye, SonicNet co-founder and owner of the Thread Waxing Space. "They get into talking about the minute details—a jacket somebody was wearing onstage or something. It's a really intense community. We're just bringing that community online."

From sound files of songs uploaded minutes after the conclusion of a recording session to online conferences with notables like Nirvana producer Steve Albini, Nye and company are working hard to create a space different from other online music services by offering users a specially tailored communications program allowing for complex graphics and new services.

"Our idea is to make SonicNet as much like you're traveling through some kind of video game or adventure," says Nye of the nine-month-old service, which boasted over 1,800 members late last year. "And for record companies, it's a resource that can be an important marketing tool. Instead of radio and record companies trying to guess what people want to buy, we can find out what they really want."

For those who really like their music underground, there's the Internet Underground Music Archive, or IUMA, which is billed as "the [Inter]net's first free hi-fi music archive."

Founded and run by two computer science students from the University of California at Santa Cruz, IUMA offers downloadable songs, pictures, and biographical information of over 300 unsigned bands, along with material from Warner Bros., Geffen, and 15 other record labels. Bands pay at least $50 to be included on the service, which allows free usage for anyone with Internet access through the Gopher, World Wide Web, and FTP gophers.

"This is a dream company of mine," says co-founder Rob Lord, who put together the system in late 1993 to introduce fellow IUMA guru Jeff Patterson's band Ugly Mugs. "We even have a band who turned down a label deal because they said, 'We've already been in *Newsweek*, what can you do for us?' "

Originally the sole province of bands like A Halo Called Fred and Plasma Boy, IUMA and its founders have come under some criticism for their decision to allow big shots like Geffen and Warner on their service. But Lord says his company actually evens the playing field between signed and unsigned artists.

"How many of the total musicians out there are served by record companies, 1%?" he says. "The other musicians can use this to reach people. The technology is already there, I'm just creating a better way to get it to people."

For some musicians, access to online technologies have helped them pursue their art. For about two years, rising new-age guitarist Ottmar Liebert has kept in touch with his office and fans through CompuServe, trading electronic mail and information with fans across the globe while on tour.

"I would never change my music because of a fan's opinion—what am I, a politician?—but it's nice to be able to read a note in the morning that was sent the night after a concert," says Liebert, responding by E-mail to questions sent to his CompuServe account.

Far from being concerned about the co-opting of cyberspace by deep-pocketed corporations, the guitarist welcomes the spread of a technology that can give a plucky entrepreneur the same edge as a multi-million-dollar business.

"This opens opportunities for smaller record companies . . . allowing small, mobile, intelligent units to outrun the big corporations. Manufacturing will not matter; moving product around the world won't matter. All we'll need is a big hard drive to hold the images. It's exciting." ●

by Eric Deggans

Getting Connected

Now that you've heard all these great things about the world of music in cyberspace, just one thing remains—getting connected.

Generally, the nationwide networks use specialized software that must be obtained from the company before you can log on. For smaller bulletin boards, you may be able to call directly with your computer, but it's wiser to make a voice call first to find out about cost information and how fees are tabulated before your meter starts running. Internet access comes from a bulletin board system or network provider—you can't dial into the network directly.

You'll want to know what the basic charge is, along with any extras (for example, CompuServe charges extra for certain forums, and access at faster baud rates is also more expensive), and what method of payment is acceptable. (*NOTE: Transmission of credit card numbers over the Internet may not be secure, so avoid it.*)

America Online: National network offering online forums from MTV, Warner Bros., Woodstock Online, and other music-related sources and services. Call (800) 827-6364 for information or to obtain interface software.

CompuServe: Worldwide network offering a host of its own music-related services, including sound samples and a special area to find information from record labels like Geffen, RCA, Warner Bros., and others. Call (800) 848-8199 for information and/or interface software.

Internet Underground Music Archive: Internet accessible site with samples of 300 unsigned bands, plus information from providers like David Geffen Co. and *Teen Beat* magazine. Call (408) 426-4862 for information or send a free message at info@iuma.com.

SonicNet: Bulletin board with information from providers like Sub Pop records and World Aid Relief, along with sound samples fresh from the studio, weekly online conferences, concert information, a free Internet address, and more. Call (212) 941-5912 for information or dial the BBS at (212) 431-1627.

The Cyberden: Bulletin board with sound samples, record release dates, multiple CD-ROMs online, Internet access, and more. Call (415) 507-0333 for information or dial the BBS at (415) 472-5527. ●

Put Your Printer To Work With Specialty Papers

No doubt about it, a computer is a handy tool to have. A computer coupled with a printer, on the other hand, is something you almost cannot live without. You can get the most out of your printer by turning it into your own professional print shop. Just add specialty papers.

With some of today's advanced graphics and desktop publishing programs, there is a lot you can do on-screen to turn regular white paper into a special creation. But with specialty and preprinted papers, you have designs that you can use to make letterhead, business cards, printed envelopes, brochures, and more.

The paper you use depends on the job you're doing, the printer you're using, and your preferences. Since most of what you'll do revolves around the printer you have, let's begin with that.

Your Printer

If you have an inkjet or a laser printer, you can make professional looking printouts. Most dot matrix printers, on the other hand, will not print the kind of text you'll want to incorporate into your special documents.

Dot matrix text is made up of little dots and does not come in a variety of fonts. But inkjet and laser printers let you use a wide array of refined fonts that look more like the ones you see on signs and in letters, brochures, newspapers, and magazines.

Because laser and inkjet printers use different methods for putting type on a page, print quality differs between the two types of printers. To form images, laser printers use **toner**, a dry powdery substance that is bonded to a page with heat. Because laser printers use this heating method, documents come out of the printer dry. Inkjet printers spray wet ink onto a page to create text and images. Because there is no heating method, the ink is still damp when the page comes out of the printer, so you have to be careful not to smear it. In general, laser printers will produce the highest quality printouts. But both inkjet and laser printers make great-looking documents with specialty papers.

If you have a laser or inkjet printer connected to your computer, you're in business. Now, you need the right paper for the job.

Specialty Papers

The paper you use depends on what you're creating. There are papers with special designs for letterhead, as well as choices for envelopes, business cards, and double-sided brochures.

Papers come in different weights, textures, and styles. Heavier papers are used for things like business cards and brochures, while letterhead and envelopes use a lighter-weight paper (similar to regular printer paper, or just a bit heavier).

Letterhead is typically printed on 24- or 28-pound paper. Brochures would be printed on heavier paper, such as 67-pound paper. (A paper's weight is determined by what the paper weighs in a specific quantity. For example, if a particular type of 8-1/2 x 11-inch letterhead paper is produced in bundles of 500 sheets and that bundle weighs 24 pounds, then it is 24-pound paper.)

Like weights, paper textures also vary. There are regular smooth papers, linens, parchments, fibrous papers, cotton papers, recycled papers, and more. Linens have a tightly woven texture of horizontal and vertical lines resembling canvas board. Parchment paper has a sort of marbled texture that is almost transparent in some areas. Some papers are smooth with little flecks that give a fibrous look, but others actually have a fibrous texture. Cotton papers may be 25% cotton or 100% cotton, which is a really soft paper. Different textures may also come in different weights, so you can get just the one you want.

Another aspect of paper to consider is preprinted designs. Companies that design specialty papers have many designs to choose from. The type of paper and/or specialty design you choose depends on what you're printing, be it letterhead or business cards. Choose a style that is appropriate for your business or personal needs and consider the way you'll be printing your documents.

For example, your letterhead design can be as simple as a few lines or a design that runs across the top of the page to accent your heading. Papers also can have borders on the top and bottom of the page, the top and left-hand sides, just the left-hand side, or all the way around the page. Borders can consist of colorful geometrical shapes, clip-art images, abstract art, floral patterns, stately or business-like designs, or textured looks, such as stone.

Letterhead papers also come with backgrounds. Backgrounds are best if they don't detract from the information on the paper. A gray, faded nature scene is one example. Other backgrounds may include clouds, muted blending colors, rainbows, shapes, or subtle designs. Backgrounds can also add texture. For example, a marble- or stone-like background may give the paper more depth.

Envelope designs can match those of your letterhead. If you're using a border on your letterhead, for example, it can run down the left-hand side of your envelope, too. Background designs used for letterhead may be displayed on envelopes and business cards.

Like letterhead, brochures use borders, clip art, backgrounds, and textured designs. Since brochures will be folded in some way, specialty paper for brochures is manufactured with a slight crease for easy folding. Designs are placed according to the way the paper is folded.

Since laser and inkjet printers produce images differently, there are papers designed for each. (You'll find that most companies provide paper specifically for both laser and inkjet printers.) For example, some companies make papers especially for inkjet printers that will accept wet ink with less bleeding and smudging. This type of paper also makes colors appear more vibrant and consistent than if printed on regular paper.

Sending a piece of paper through a printer can do more than just produce type. When a piece of paper is pulled into a printer, most laser and inkjet models will wrap the paper around a cylinder before sending it back out. Regular laser paper isn't usually affected by this, but heavier weight paper, such as brochure paper and heavy letterhead paper, can curl. To avoid this, some printers have pass-through doors in back that can be opened so a piece of paper feeds straight through without wrapping around the cylinder. If your printer does not have this capability, try using a copy machine.

A copy machine is a more efficient method of printing documents on specialty papers when you are printing in large quantities. When quantity becomes an issue, you might consider taking your paper and designs to a professional print shop to be copied.

Take It To The Pros

You can utilize a professional print shop in several ways, depending on your needs and what you're willing to pay.

The least expensive method would be to make a master copy of your document with your computer and printer, purchase specialty paper, and make copies at a copy center. This way, you only pay for the paper and the cost of making copies. Some print shops also have computers and printers that you may use for a fee. If you choose paper from the print shop and have the documents printed for you, there will be an additional fee added to the cost of the paper and the copies.

If you're printing items such as letterhead or brochures for a small business, chances are you'll be printing in large quantities. For jobs of 100 copies or more, print shops are not only more convenient, but more economical. Most print shops even give discounts for large print orders.

Compare The Cost

If you're just starting a business, cost may be an issue, so let's take a look at the numbers.

To compare prices of specialty papers with preprinted designs, browse through catalogs from different companies. You can buy items such as letterhead, envelopes, and brochures by the box. The more you order at once, the less they cost per box. (Prices in this article are averaged, based on comparison of several mail-order catalogs.)

On average, you'll pay about $15 for 10 or more 100-sheet boxes of letterhead. If you only order a couple of boxes, you'll pay closer to $20. Envelopes generally come in boxes of 50 and cost between $12 and $14, depending on whether you order more than 10 boxes or just a few. Since brochures use heavier paper, they cost a little more. Ten or more boxes of brochures, 75 in each, will cost around $25 a box.

Most companies also have business packages that contain letterhead, envelopes, brochures, and business cards, which may be more economical for a new business. You can find these for $70 to $90.

If you do all your own printing, the paper will be your principle cost. Or you can take your specialty paper to a professional printer and pay the additional cost of copying your letterhead layout onto the paper. For example, if you bring in a stack of preprinted design paper and an original copy of your layout, you can have copies made at a standard rate per copy. If the standard rate is, for example, six cents per copy, 100 copies would cost $6.

How To Order

There are several companies from which you can order specialty papers. Here are a few that you can call to obtain a catalog and begin browsing.

Image Street
(Moore Business Products Division)
(800) 462-4378

Paper Direct
(800) 272-7377

Paper Presentations Inc.
(800) 947-2000

Premier Papers Inc.
(800) 843-0414

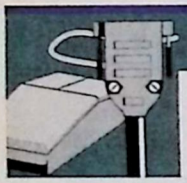
Queblo, a division of Stationery House Inc.
(800) 523-9080 ●

If you've created your layout on your home computer, be sure to bring in an original printed copy rather than a diskette. Not only will you prevent system compatibility problems, you'll also save yourself additional expense. If you choose to use the computers and printers at the print shop, be prepared to pay an hourly rate or a flat rate of $5 to $10.

The route you take depends on the quantity of printouts you need and what you can afford. You cannot, however, afford to overlook what you and your printer can do with specialty papers. ●

by Jennifer Larson

Need some help with your hardware or software?
Looking for simple explanations on technical subjects?
Send us your questions!

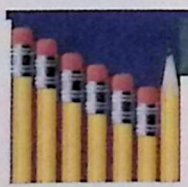


Miscellaneous Hardware

Q: *When my mouse went haywire, my system froze up and I was unable to use Windows. How can I disconnect the mouse so that I can manually use Windows 3.1?*

A: Here are three things to do, and in this order:

1. Remove the bottom cover from the mouse and check the ball to determine if it's hung up on some sort of debris. Clear any obstructions and reassemble the mouse.
2. Reinstall the mouse driver program. Use the driver program found on the diskette that came with the mouse. Then restart the machine and try Windows again.
3. If your mouse truly is a dud after trying steps 1 and 2, turn off your PC and unplug the mouse from the rear of the cabinet and replace it with a new mouse.



Word Processing

Q: *When I try to use Windows Write, I see a dialog box that tells me that there is a General Protection Fault in Unidriv.dll.*

A: Reinstall Windows from your original Windows diskettes to repair an apparently defective Unidriv.dll file.

Q: I bought a used machine with WordPerfect 5.0 on it. Unfortunately, I don't have any documentation for the program, and I know nothing about WordPerfect. With other programs I can get online help by pressing F1, but that just gives me an "Undelete" message in WordPerfect. How do you access online help in this program?

A: As you've already discovered, WordPerfect has its own way of doing things. Press F3 to bring up online help. Press F3 a second time to bring up a template that illustrates function key operations, or press any letter to move into an alphabetical listing of functions. To escape back to your original document, press the SPACE bar.

Computer Hardware

Q: *My menu program shows the time and date, which it gets from the computer. It's losing hours each day. A friend said: (a) My CMOS/clock battery is dying; (b) Before the battery dies, and before replacing it, I'd better record information from my CMOS setup; (c) if I "lose" the information in the setup, I'll be in trouble; and, (d) I can see my needed info in setup by holding the CTRL-ALT-INSERT keys during startup to provoke an error and wait until the computer asks if I "want to run setup."*

A: He's right. A slow clock (even 10 lost minutes a day) is your early warning of battery failure. Incorrect time is the minor problem; If ignored, things get serious. If the battery dies, or is pulled out (to replace), your computer loses its CMOS memory about what "disk type" it has. This is reset with a program called CMOS Setup—either by typing in a number for the disk type (such as 30) or by typing in a bunch of arcane numbers for what Setup calls a "User Configurable Disk Type." An entry may look something like "Heads=6, Cylinders=792, Sectors=33." These are called "disk parameters." The easy way to get these numbers is to record them off your CMOS Setup screens (since your computer is still running, the disk information is still there for now) or by phoning the manufacturer of your hard disk. Even after getting a new battery, a computer whose Setup program has forgotten its disk type or parameters won't function until someone tells it the disk type again. Sometimes you can plug in your new battery before removing the old one, thereby avoiding any loss of setup info. But if you do lose it, figuring out what disk type you have is much harder than just copying it from the setup screens before total battery amnesia sets in. Most computers, during startup, say something like "PRESS <Del> key to change setup". Your friend's trick for getting into setup to discover your disk type and other necessary information might also work. Very old computers and some IBMs require a special disk to get into setup. (See "CMOS Setup" in the February 1992 issue of *PC Novice*.)

Q: I've been browsing advertisements on computers and I keep running across a reference to "on-board cache". What does that refer to, and is it an important feature to look for in a PC?

Computer Hardware

A: Cache (pronounced "cash") memory is a special type of memory in a PC; it holds information that the computer accesses frequently or is likely to access in the near future. Some microprocessors, especially more powerful ones, have cache that's built in (on-board). Cache memory is expensive, but it greatly speeds up some operations on a PC. The more you have, the merrier you'll be.

Operating Systems

Q: *I'm running MS-DOS 6.2 and have a 120MB tape drive, with a 16MHz 386SX computer. I'm reluctant to use DOS' disk-compressor to double my disk space; I'm not sure if I'd have problems with my Windows permanent swapfile, and am confused about what happens to my tape drive (which also compresses data).*

A: Modern disk-compressors are generally safe, though theoretically they slightly increase the risk of accidental data loss. MS-DOS 6.0's compressor was suspected of being unreliable, but 6.2 and 6.22, and new third-party products like *Stacker* seem OK. If, as we hope, you're always completely backed up anyhow, you needn't lose sleep about the idea of having a major data loss on average, for example, of every three years instead of every four years. With a fairly slow computer like your 386SX, expect a slight penalty in disk speed. Your tape drive doesn't know or care about your compressed disk. Absurdly, the disk compressor will uncompress the data to feed it to the tape drive, the tape drive will then recompress it onto tape. As for your swapfile: When you install compression it will notice the swapfile and work around it, thereby leaving it uncompressed. As long as you adjust your permanent swapfile to be as big as you want *before* beginning the compression process, it should be fine.

Q: *When I defragment the files on my hard disk using DEFRAG, there is a row of Xs in the middle that are unmovable files. Is there any way to move these files to the beginning of the disk?*

A: Unmovable files are made that way because an application needs to find them stored exactly where they were created. If you're a Windows user, you are probably seeing the permanent swap file, illustrated by the multiple Xs. Your DOS system files appear at the very beginning of your drive, whether you like it or not. The only way you can approach placing any of your hidden/system files at the beginning of your hard drive is to first reformat the drive, then reinstall any software that creates hidden/system files first (i.e. Windows 3.1) before adding other programs.

Q: *Is there a way I can keep people from exiting Windows, except myself?*

A: Windows itself has different ways to disable the unauthorized exiting of Program Manager. You can either use the password-protected screen saver called "Marquee" offered by Control Panel, or you can change Progman.ini settings to remove the Exit command from Program Manager's File menu. The screen saver option is your best bet if people are fooling around with your system in your absence. Microsoft does offer a product that can help you omit menu items available from Program Manager's menus. It's called the *Windows 3.1 Resource Kit*, available from any reputable software reseller. The Resource Kit is chock full of interesting tricks and turns for MS Windows.

Q: *I found the MSD command in the "DOS Command Dictionary" in the August 1994 issue of PC Novice. When I tried to run it, I got the following message on my screen: "Environment string is invalid TEMP=C:\DOS\TEMP". What does this mean?*

A: Many programs create temporary files while they are running and use these temporary files as short-term workspaces. Most programs that create temporary files delete them when you exit. If you reboot your computer or do anything that keeps these programs from deleting their temporary files upon normal exiting, these temporary files remain strewn about your hard drive, taking up space and cluttering your disk.

Your problem is that your TEMP directory is either missing or its name doesn't exactly match the one named in your Autoexec.bat file. The way to approach a quick solution is to create a directory called C:\TEMP on your C: drive by typing **mkdir c:\temp**. Then use any text editor program (like the one that comes with MS-DOS 5.0 and higher called Edit.com) to create a file named Autoexec.bat in the root directory of your C: drive, or edit an existing Autoexec.bat file. Using an editor program, place these two statements (on separate lines) in the Autoexec.bat file:

```
SET TEMP=C:\TEMP
SET TMP=C:\TEMP
```

You first have to create that TEMP directory on your hard drive, then add these two statements to Autoexec.bat in order to solve your problem. It doesn't matter if the statements are the only ones in the Autoexec.bat file, nor does it matter where you place these statements, so don't worry about upsetting any apple carts while editing—just be accurate.

Q: *I have two C:\ DOS prompts on my screen when I start my computer, one above the other. Can you straighten this out?*

A: Check your Autoexec.bat file for empty lines of text at the bottom of the file. Be sure to delete any open spaces at the end of the last command line and any blank lines thereafter.

Q: *Are there programs that will let me use more than eight characters in a file name?*

A: Sherlock (2010 Software Corp, 800-952-2314) takes over your Windows programs' Save and Open functions to allow 254-character file names. *WordPerfect* 5.1 for DOS will create and read its own long file names if you press F5 (to display files), then press 5 to set long file names. In fact, most major word processors allow you to save an extensive summary description with a file and view it when browsing for files to load. Most users don't take advantage of this powerful feature. All

Operating Systems

long-file-name add-ons have some limitations. Windows 95 (expected to be released later this year) will allow long file names for all its programs, but old Windows programs, until upgraded for Windows 95 or supplemented with Sherlock, will still use eight-character names.

Q: *What is the best sequence of statements in Config.sys and System.sys? How about memory?*

A: There is no System.sys. If you mean Windows' System.ini file, the order is largely unimportant. Config.sys is an other story. Usually the order doesn't influence the computer's operations too much (see "CONfiguring your SYStem" in the May 1994 issue of *PC Novice*), but there are a few statements that have to be entered in a particular order. For example, Himem.sys has to go before Emm386.exe and DOS=HIGH; Emm.386.exe has to go before DOS=UMB. If you're trying to finetune Config.sys to get the most utility out of lower DOS memory, run MEMMAKER and it will adjust the order of the lines in Config.sys and Autoexec.bat to maximize their use of upper memory.

Q: *My visiting son used MS-DOS 5.0's PASSWORD.COM command to put a password on my computer. I know the password, but want to remove it. How? Also, I have upgraded to MS-DOS 6.0 and used DoubleSpace to expand my disk space, but your February 94 issue implies that's not recommended. How do I remove DoubleSpace?*

A: You're lucky, at least you know the password. Everyday someone locks themselves out of a disk or file with a lost password, and sometimes there's no way back in without erasing the whole hard disk. Unfortunately, there is no Password feature in MS-DOS 5.0 and no Password.com utility with it. Perhaps you're talking about DR-DOS 5.0. If so, run the DR SETUP utility and disable security there. Otherwise, we suggest tricking your son into visiting, and holding his car keys until he removes it for you. Passwords cause much trouble, so if you don't need them don't use them.

As for DoubleSpace, read "Decompressing without Disaster" in the August 1994 issue of *PC Novice*. With DoubleSpace in MS-DOS 6.00, you'd have to first back up everything (programs and data) on your disk that you don't want to lose onto tape or floppy diskettes before trying to remove it. DoubleSpace with MS-DOS 6.00 was suspect. If you can find an update to MS-DOS 6.20 (which has an improved DoubleSpace) or MS-DOS 6.22 (which has the DriveSpace Utility instead of DoubleSpace), that might be a way to have your cake (extra space) without your data eating it (having data problems) too.

Q: When I use the DIR command all the information flies by so fast I can't read it. Is there any way to slow things down to a reasonable pace?

A: Type **dir /p** and hit ENTER. The /P parameter will cause the scrolling screen to pause and prompt you to press any key to continue. You can also try using **dir | more** to accomplish the same thing (the | symbol is usually located above the backslash key). Otherwise, try typing **dir /w** to view your directory's contents on a screen that's five columns wide. You won't be able to view some of the additional file information with /W, such as when the files were created, but it's a nice way to see the contents of a large directory all at once on-screen.

Design/Paint Programs

Q: *Can I make Microsoft Publisher compatible with Microsoft Powerpoint? What I would like to do is transfer clip art from Powerpoint to Publisher.*

A: We'll assume you're talking about current versions of both programs. You can use PowerPoint clip art in any program from which you can launch Clip Art Gallery. For programs that don't actually have a Clip Art Gallery menu item, click on the Edit menu or the Insert menu, choose Insert or Insert Object. Then look for Clip Art Gallery and click or double-click on it. This should bring the Clip Art Gallery inside the other program.

Q: *I produced a modest greeting card with Publisher 2.0. I tried to print 20 cards. It took almost 45 minutes before the first card even started printing. Is this normal, or are there ways to speed this up? I have a 486DX2/50 computer, 8MB RAM, and an HP4-L printer.*

A: "No" and "Yes, probably." It's definitely not normal, especially not for a fast computer and modern printer combination like yours. We'd say that anything over five minutes to get the first page out of your printer, even for intense graphics, is suspicious. The first question is whether only Publisher is slogged down or if other programs are printing slowly as well. Try printing a page of regular text using the Windows Write program, found in your Accessories Group. (The file Readme.wri is a readily available sample.) With your system it should take about 15 seconds until the printer begins to print, and maybe 30 seconds until the page is completely out of the printer. If that's more-or-less normal, then your problem is in your Publisher program, and you should call its manufacturer for help or reinstall it. If the other programs, like Write, *also* print slowly, you need to investigate general Windows factors. First, make sure you have the right printer driver. Click on File, then Print, then Setup, and then press the About button. It will tell you about the printer driver. Write it down, then call Hewlett-Packard or Microsoft and make sure that that's the right driver for your HP4-L. Try turning off Print Manager completely (you do that through the Control Panel that is found in the Main Program Group in your Program Manager). If that helps, it means there's a problem with Print Manager. Get into Print Manager, click on Options, and make sure that the Background Print Priority is set to "normal" or "high", not "low." ●

Get straight answers to your technical questions. Ask PC Novice! Send your questions to: PC Novice Q&A, P.O. Box 85380, Lincoln, NE 68501. (Volume prohibits individual replies.)

GLOSSARY
Of Terms

Autoexec.bat—A special file containing instructions that are carried out every time the computer system is started or restarted. These instructions help the computer get set up and find certain programs.

Bit—The smallest unit of computer data. Each bit has a value of either 0 or 1 that tells whether an electronic pulse is "off" or "on," respectively.

Byte—A unit of measurement equal to eight bits. One character equals one byte of information. Storage capacities are measured in either kilobytes (approximately 1,000 bytes) or megabytes (approximately one million bytes).

Clock Doubling—In a microprocessor, the internal clock rate (not the bus size) of the chip is doubled, while the external processing rate remains the same.

Clock Speed—Computers contain internal clocks, called system clocks, that the microprocessor uses to regulate vibrations to measure speed. The faster the clock speed, the faster the computer will execute commands.

Config.sys—A text file DOS consults at system startup. This file contains commands that tell DOS how to communicate with new hardware, to customize communication with existing hardware, or to adjust your computer's memory usage.

Command—A word or string of text that gives the computer instructions on how to manipulate data.

CPU—Central Processing Unit. Also called the microprocessor, this chip acts as the "brain" of the computer. It controls the computer's actions and can find, decode, and carry out instructions and assign tasks to other computer resources, such as a coprocessor.

Current Directory—The directory in which you are presently working.

Data Bus—The channel that transports data to and from the microprocessor. The size of the data bus directly affects the system's processing speed.

Desktop Publishing—A type of computer application that lets a PC generate typeset-quality text and graphics.

Inkjet Printer—A printer that produces images and text by spraying wet ink onto a page in the form of the text and images.

Input Device—A piece of computer hardware, such as a mouse or keyboard, used to enter and manipulate information.

Internet—A non-commercial, self-governing network devoted mostly to communication and research with some 20 million users worldwide. The Internet is not an online service and has no real central "hub." Rather, it is a collection of tens of thousands of networks, online services, and assorted single-user computers.

Laser Printer—A printer that produces text and images on a page using a dry powdery substance called toner and heat to adhere the toner to the page.

Math Coprocessor—An optional chip that can be connected to the microprocessor to speed up mathematical and graphical functions.

Megabyte (MB)—A common measurement of storage memory. It has an exact value of 1,048,576 bytes, although it's usually rounded to one million bytes.

Megahertz (MHz)—Used to measure a system's speed. One MHz is equivalent to one million cycles per second.

Microprocessor—Also known as the central processing unit, or CPU, the microprocessor acts like the brain of your computer, containing all its central processing functions.

Motherboard—The circuit board containing the vital componenets of a computer system. The microprocessor is located on the motherboard and all expansion boards must be connected to it as well.

Online Service—A dial-up service that provides news, information, and discussion "forums" for users with modem-equipped computers.

Operating System—The software that controls your system and provides the basis for all other software you run on it. Examples of operating systems are DOS and OS/2 for IBM-compatible computers and System 7 for Macintosh.

Path—The route DOS follows to search for a program or batch file when it's not found in the current directory.

RAM—Random-Access Memory. The temporary memory storage area used to load program instructions and store files currently in use. Unless a file is permanently stored on an item like a hard disk, changes to its information will be lost because RAM is cleared when a computer is turned off.

Root Directory—The main directory on a diskette or hard disk, created when the storage device is formatted. All directories and files stored on the disk are inside this directory.

System Files—Files required to run the computer's operating system.

Telecommunications—The process of computers communicating electronically, usually over telephone lines.

Template—A ready-to-use, permanent document set up with basic layout, formatting commands, and formulas. You enter information into the predesigned format to create individualized reports, letters, and other documents.

800 Reader Service

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Letters To The Editor

Dear *PC Novice*:

I really appreciated the article on "SETVER: DOS Revisited" in the December 1994 issue. I wonder how much software I've given up as defective actually related to that article. I work in Windows, but I play in DOS. I have enjoyed building batch files, and am wondering if you will cover writing batch files in future articles?

Hank Wilson/ Ottawa, KS

(*Thanks for the suggestion. Look for an article on this topic in upcoming issues. —Ed.*)

Dear *PC Novice*:

I placed my subscription of *PC Novice* and am now looking forward to receiving the next issue. Many thanks for the way that you write your articles—no unexplained acronyms, every day English, and the glossary of terms. For the first time, I don't feel like a dummy reading about computers. The "Subscriber Service Information" really says it all, you really do want to service your subscribers. All in all, I am so impressed! I just wish that I would have known about your great magazine a couple of years ago.

A.E. Small/Evansville, IN

Dear *PC Novice*:

Your *PC Novice Guide To Windows* came at a very good time for me. I am still learning to navigate the program and you simplified things. The manual is difficult to find things in and even the online help doesn't always answer my questions. I have been reading your magazine a little over a year and beat a trail to the magazine rack for the next issue. Thank you very much for a magazine written for the average beginner.

Lynn Huntley/Prineville, OR

Letters to the Editor should be sent to: *PC Novice* / P.O. Box 85380 Lincoln, NE 68501-5380. Letters may be edited for clarity or space.

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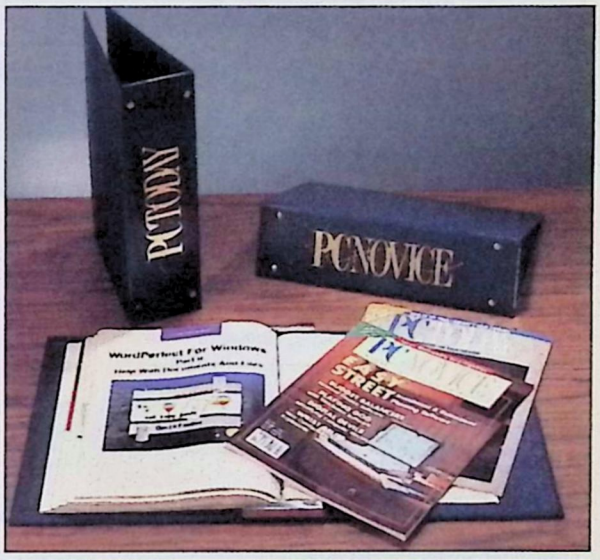

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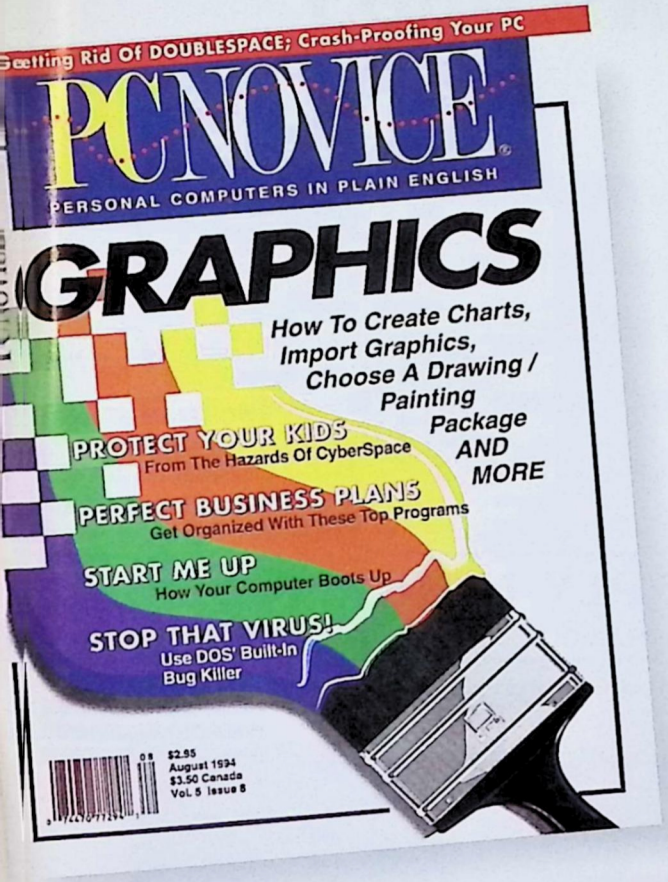

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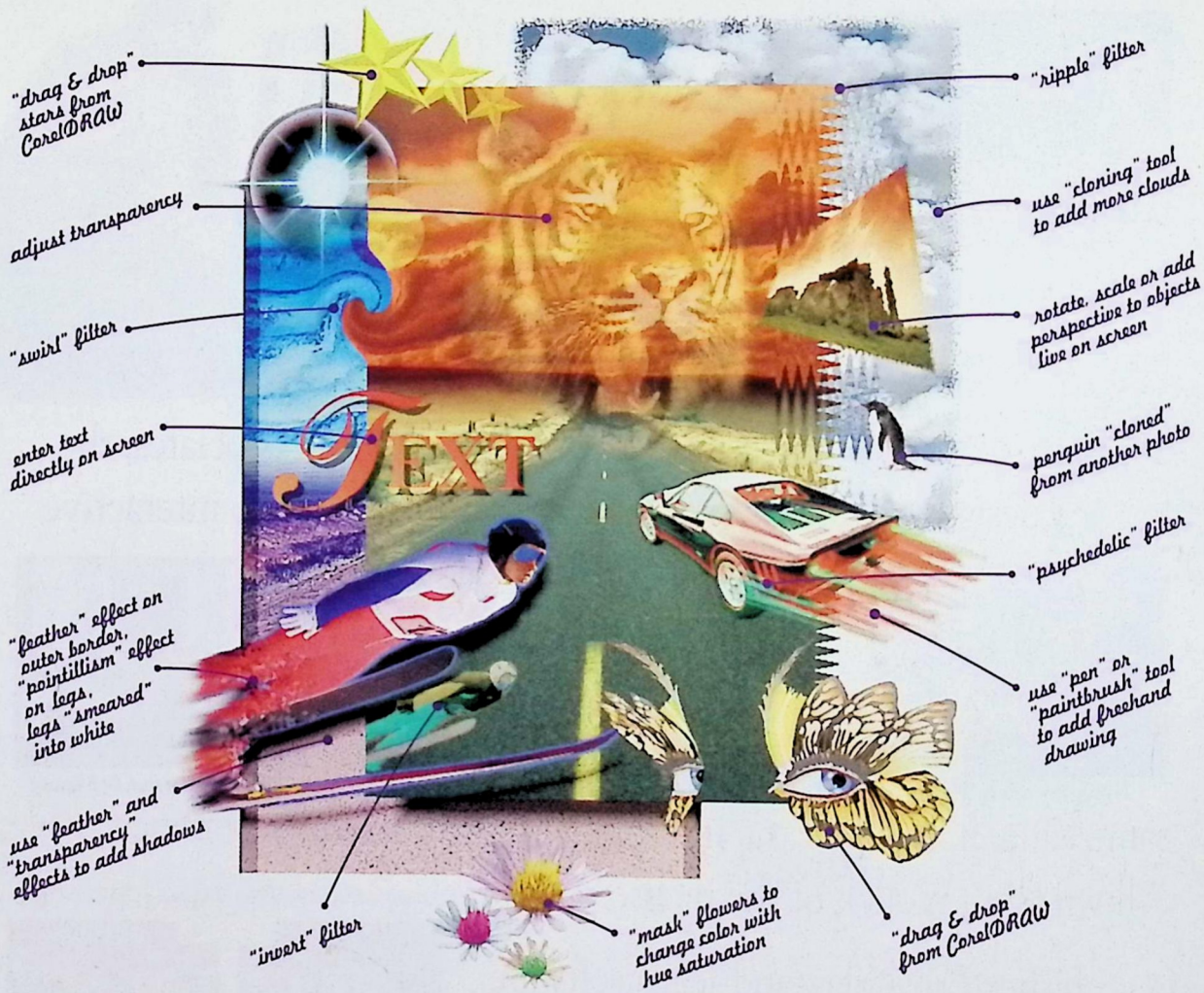

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